

=> file reg

FILE 'REGISTRY' ENTERED AT 16:51:17 ON 12 AUG 2004
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=> d his nofile l1-

FILE 'REGISTRY' ENTERED AT 14:50:04 ON 12 AUG 2004

L1	1	SEA	ABB=ON	PLU=ON	ZINC OXIDE/CN
L2	1	SEA	ABB=ON	PLU=ON	PALLADIUM/CN
L3	5	SEA	ABB=ON	PLU=ON	(1314-13-2 AND 7440-05-3)/CRN
L4	103	SEA	ABB=ON	PLU=ON	(ZN(L)O(L)PD)/ELS
L5	7	SEA	ABB=ON	PLU=ON	(L3 OR L4) AND 3/ELC.SUB
L6	111	SEA	ABB=ON	PLU=ON	(ZN(L)O)/ELS AND 2/ELC.SUB

FILE 'CAPLUS' ENTERED AT 15:02:46 ON 12 AUG 2004

L7	1	SEA	ABB=ON	PLU=ON	L3/CAT OR L5/CAT
L8	1409	SEA	ABB=ON	PLU=ON	L6 AND L2
L9	690	SEA	ABB=ON	PLU=ON	L8 AND CAT/RL
L10	691	SEA	ABB=ON	PLU=ON	L7 OR L9
L11	53782	SEA	ABB=ON	PLU=ON	PORE(2A) (SIZE OR VOLUME OR MICRON OR MU)
L12	10	SEA	ABB=ON	PLU=ON	L10 AND L11

FILE 'REGISTRY' ENTERED AT 15:06:30 ON 12 AUG 2004

L13	1	SEA	ABB=ON	PLU=ON	RUTHENIUM/CN
L14	1	SEA	ABB=ON	PLU=ON	CERIUM/CN
L15	1	SEA	ABB=ON	PLU=ON	ZIRCONIA/CN
L16	1	SEA	ABB=ON	PLU=ON	ALUMINA/CN
L17	4	SEA	ABB=ON	PLU=ON	(7440-05-3 OR 7440-18-8)/CRN AND 7440-45-1/
					CRN AND (1314-23-4 OR 1344-28-1)/CRN

FILE 'REGISTRY' ENTERED AT 15:17:18 ON 12 AUG 2004

L18	3	SEA	ABB=ON	PLU=ON	((PD OR RU) (L)CE(L) (ZR OR AL) (L)O)/ELS
AND					4/ELC.SUB
L19	7	SEA	ABB=ON	PLU=ON	L17 OR L18

FILE 'CAPLUS' ENTERED AT 15:20:59 ON 12 AUG 2004

L20	2	SEA	ABB=ON	PLU=ON	L19/CAT
L21	462	SEA	ABB=ON	PLU=ON	(L13 OR L2) AND L14 AND (L15 OR L16)
AND					

Henderson

CAT/RL
 L22 377 SEA ABB=ON PLU=ON CERIUM(2A) PROMOT?
 L23 14 SEA ABB=ON PLU=ON L21 AND L22
 L24 84 SEA ABB=ON PLU=ON (L13 OR L2 OR RU OR PD OR RUTHENIUM OR
 PALLADIUM) (L) (CERIUM OR CE OR L14) (L) (L15 OR ZRO? OR

ZIRCONIA

OR AL2O3 OR ALUMINA OR L16) (L) PROMOT? AND CAT/RL
 L25 11 SEA ABB=ON PLU=ON (PALLADIUM-RUTHENIUM) (L) (ZIRCONIA OR
 ALUMINA OR ZRO? OR AL2O3) AND CAT/RL
 L26 116 SEA ABB=ON PLU=ON L12 OR L20 OR L24 OR L23 OR L25

FILE 'CAPLUS' ENTERED AT 15:42:07 ON 12 AUG 2004

L27 8937 SEA ABB=ON PLU=ON (STEAM OR WATER(2A) GAS OR
 WATER(2A) VAPOR) (2

A) REFORMING OR HYDROFORMING

L28 53 SEA ABB=ON PLU=ON (METHYL OR ETHYL OR PROPYL OR
 ISOPROPYL OR

BUTYL OR ISOBUTYL OR T-BUTYL) (L) (ALCOHOL OR

ALC) (L) REFORMING

OR METHAFORMING

L29 2377 SEA ABB=ON PLU=ON (METHANOL OR ETHANOL OR PROPANOL OR
 ISOPROPANOL OR BUTANOL OR ISOBUTANOL OR T-BUTANOL OR MEOH
 OR

ETOH OR PROH OR I-PROH OR BUOH OR I-BUOH OR

T-BUOH) (L) (REFORMIN

G)

L30 6 SEA ABB=ON PLU=ON (L27 OR L28 OR L29) AND L26

L31 243624 SEA ABB=ON PLU=ON STEAM? OR (WATER OR H2O) (2A) GAS## OR
 WATERGAS##

L32 42109 SEA ABB=ON PLU=ON REFORM?

FILE 'REGISTRY' ENTERED AT 16:37:36 ON 12 AUG 2004

E METHANOL/CN

L35 1 SEA ABB=ON PLU=ON METHANOL/CN

E ETHANOL/CN

L36 1 SEA ABB=ON PLU=ON ETHANOL/CN

E N-PROPANOL/CN

L37 1 SEA ABB=ON PLU=ON N-PROPANOL/CN

E ISOPROPANOL/CN

L38 1 SEA ABB=ON PLU=ON ISOPROPANOL/CN

E N-BUTANOL/CN

L39 1 SEA ABB=ON PLU=ON N-BUTANOL/CN

E ISOBUTANOL/CN

L40 1 SEA ABB=ON PLU=ON ISOBUTANOL/CN

E TERT-BUTANOL/CN

Henderson

L41 1 SEA ABB=ON PLU=ON TERT-BUTANOL/CN
E SEC-BUTANOL/CN
L42 1 SEA ABB=ON PLU=ON SEC-BUTANOL/CN
L43 8 SEA ABB=ON PLU=ON (L35 OR L36 OR L37 OR L38 OR L39 OR
L40 OR
L41 OR L42)

FILE 'CAPLUS' ENTERED AT 16:44:53 ON 12 AUG 2004
L44 1025781 SEA ABB=ON PLU=ON L43 OR (METHYL OR ETHYL OR PROPYL OR
BUTYL
OR ISOPROPYL OR ISOBUTYL) (2A) (ALC# OR ALCOHOL#) OR MEOH OR
ETOH OR PROH OR NPROH OR IPROH OR BUOH OR IBUOH OR SBUOH
OR
TBUOH OR METHANOL# OR ETHANOL# OR PROPANOL# OR
ISOPROPANOL# OR
BUTANOL# OR ISOBUTANOL#

L45 751969 SEA ABB=ON PLU=ON ALC# OR ALCOHOL#
L46 6924 SEA ABB=ON PLU=ON FISCHER# (2A) TROPSCH#
L47 4 SEA ABB=ON PLU=ON L26 AND L31
L48 12 SEA ABB=ON PLU=ON L26 AND L32
L49 4 SEA ABB=ON PLU=ON L47 AND L48
L50 12 SEA ABB=ON PLU=ON L26 AND L44
L51 5 SEA ABB=ON PLU=ON L26 AND L45
L52 6 SEA ABB=ON PLU=ON L26 AND L46
L53 22 SEA ABB=ON PLU=ON (L47 OR L48 OR L50 OR L51 OR L52) NOT
L30
L54 88 SEA ABB=ON PLU=ON L26 NOT (L30 OR L53)

=> file caplus

FILE 'CAPLUS' ENTERED AT 16:52:23 ON 12 AUG 2004
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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=> d 153 1-22 cbib abs hitstr hitind

L53 ANSWER 1 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2003:546508 Document No. 139:294208 Designing New High Oxygen Mobility
Supports to Improve the Stability of Ru Catalysts Under Dry
Reforming of Methane. Menad, S.; Ferreira-Aparicio, P.; Cherifi,
O.; Guerrero-Ruiz, A.; Rodriguez-Ramos, I. (Instituto de Catalisis y

Henderson

- Petroleoquimica CSIC, Madrid, 28049, Spain). Catalysis Letters, 89(1-2), 63-67 (English) 2003. CODEN: CALEER. ISSN: 1011-372X. Publisher: Kluwer Academic/Plenum Publishers.
- AB The application of a novel Ce_{0.5}Zr_{0.5}O₂ mixed oxide prepd. by the microemulsion method as a support of Ru catalysts for the **reforming** of CH₄ with CO₂ originates a high-activity catalytic system with excellent stability under reaction conditions. The support characteristics clearly det. the catalytic stability of Ru catalysts under CH₄ + CO₂ reaction conditions. The introduction of **cerium** as a **promoter** in the ZrO₂ structure is shown to improve the catalyst performance by increasing the oxygen mobility in the support and consequently reducing deactivation by carbon deposition during reaction.
- CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
- ST methane carbon dioxide **reforming** catalyst support synthesis gas; dry **reforming** ruthenium catalyst support cerium zirconium oxide
- IT **Reforming** catalysts
Synthesis gas manufacturing
(stability of Ru catalysts under dry **reforming** of methane)
- IT 7440-44-0, Carbon, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(catalyst coke deposition, control of; stability of Ru catalysts under dry **reforming** of methane)
- IT 53169-24-7, Cerium zirconium oxide (Ce_{0.5}Zr_{0.5}O₂)
RL: CAT (Catalyst use); USES (Uses)
(catalyst supports; stability of Ru catalysts under dry **reforming** of methane)
- IT 74-82-8, Methane, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(stability of Ru catalysts under dry **reforming** of)
- IT 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); USES (Uses)
(stability of Ru catalysts under dry **reforming** of methane)
- IT 124-38-9, Carbon dioxide, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(stability of Ru catalysts under dry **reforming** of methane)
- L53 ANSWER 2 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2003:545775 Document No. 139:103488 Method and apparatus for producing high-molecular-weight liquid hydrocarbons from air and methane and/or

natural gas. Harford, Steven Thomas; Borsa, Alessandro Giorgio; Vanderborgh, Nicholas Ernest (Blue Star Sustainable Technologies Corporation, USA). U.S. US 6593377 B1 20030715, 6 pp. (English).

CODEN:

USXXAM. APPLICATION: US 2002-83176 20020226.

AB A method is described for converting a mixt. of a low-mol.-wt. hydrocarbon

gas and air into a C5+ liq. hydrocarbon having direct utility as a compression-ignition fuel comprises: providing a packed-bed catalytic partial oxidn. reactor; providing a first catalyst in the catalytic partial oxidn. reactor selected from a platinum-group catalyst, a **promoted** platinum-group catalyst, a rhodium catalyst, and a platinum-**promoted** rhodium catalyst; providing a mixt. of low-mol.-wt. hydrocarbon gas and air to an input of the catalytic

partial

oxidn. reactor; and providing a first packed-bed **Fischer-Tropsch** reactor. The process further comprises: providing a second supported catalyst in a first **Fischer-Tropsch** reactor consisting of 3-60 parts cobalt and 0.1-100 parts of at least

one

metal selected from **cerium**, lanthanum, platinum, and **ruthenium** per 100 parts of a support selected from silica, **alumina**, and combinations of silica and **alumina**; providing an output of the catalytic partial oxidn. reactor to an

input of

the first **Fischer-Tropsch** reactor; and sepg. an output of said first **Fischer-Tropsch** reactor into a first liq.-phase compression-ignition fuel output and a first gas-phase

output

in the absence of recycling of any portion of the output of the first **Fischer-Tropsch** reactor to the catalytic partial oxidn. reactor. A process flow diagram is presented.

IC

ICM C07C027-00

NCL

518706000; 518702000; 518703000; 518715000

CC

51-9 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 23, 45, 48

ST

liq fuel manuf natural gas conversion **Fischer Tropsch** reaction; methane oxidn **Fischer Tropsch** reaction manuf liq hydrocarbon fuel

IT

Platinum-group metals

RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP

(Physical, engineering or chemical process); PROC (Process); USES

(Uses)

(catalysts; method and app. for producing high-mol.-wt. liq. hydrocarbons from air and methane and/or natural gas)

Henderson

IT **Fischer-Tropsch** catalysts
Fischer-Tropsch reaction

Oxidation catalysts

(method and app. for producing high-mol.-wt. liq. hydrocarbons
from air
and methane and/or natural gas using)

IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 159995-97-8,
Aluminum

silicon oxide

RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP

(Physical, engineering or chemical process); PROC (Process); USES

(Uses)

(catalyst support; method and app. for producing high-mol.-wt. liq.
hydrocarbons from air and methane and/or natural gas using)

IT 7439-91-0, Lanthanum, uses 7440-06-4, Platinum, uses 7440-16-6,
Rhodium, uses 7440-18-8, Ruthenium, uses 7440-45-1, Cerium, uses
7440-48-4, Cobalt, uses

RL: **CAT (Catalyst use)**; EPR (Engineering process); PEP

(Physical, engineering or chemical process); PROC (Process); USES

(Uses)

(catalysts; method and app. for producing high-mol.-wt. liq.
hydrocarbons from air and methane and/or natural gas)

L53 ANSWER 3 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2003:236976 Document No. 138:403879 An integrated process of a two-stage
fixed bed syngas production and F-T synthesis for GTL in remote gas
field.

Dai, Xiaoping; Yu, Changchun; Li, Qiang; Zhang, Changbin; Jiang,
Qiyang;

Shen, Shikong (The Key Laboratory of Catalysis, CNPC, University of
Petroleum, Beijing, 102249, Peop. Rep. China). Chinese Journal of
Chemical Engineering, 11(1), 85-89 (English) 2003. CODEN: CJCEEB.

ISSN:

1004-9541. Publisher: Chemical Industry Press.

AB A novel process for catalytic oxidn. of methane to synthesis gas
(syngas),

which consists of two consecutive fixed-bed reactors with air
introduced

into the reactors, integrated **Fischer-Tropsch**
synthesis, was studied. At the same time, a catalytic combustion
technol.

was studied for using the F-T offgas to generate heat or power energy.
The two-stage fixed reactor process keep away from explosive limits of
CH₄/O₂ mixt. The integrated process is fitted to produce diesel oil

and

Henderson

lubricating oil in remote gas field.
IT 7440-05-3, Palladium, uses
RL: CAT (Catalyst use); USES (Uses)
(loaded with platinum on γ -alumina, methane oxidn. catalyst;
integrated process of two-stage fixed bed syngas prodn. and F-T
synthesis for GTL in remote gas field)
RN 7440-05-3 CAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IT 7440-45-1, Cerium, uses
RL: CAT (Catalyst use); USES (Uses)
(silica promoted with Ce/Co; integrated process of two-stage
fixed bed syngas prodn. and F-T synthesis for GTL in remote gas
field)
RN 7440-45-1 CAPLUS
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT 1344-28-1, Alumina, uses
RL: CAT (Catalyst use); USES (Uses)
(γ -, Pd-Pt loaded, support, methane oxidn. catalyst; integrated
process of two-stage fixed bed syngas prodn. and F-T synthesis for
GTL
in remote gas field)
RN 1344-28-1 CAPLUS
CN Aluminum oxide (Al₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67

ST integrated stage syngas **Fischer Tropsch** fuel natural
gas oxidn; fixed bed FT catalyst diesel lubricating oil perovskite
lanthanum; lanthanum promoted catalysis combustion partial oxidn
Fischer Tropsch hydrogenation

IT Diesel fuel
Fischer-Tropsch reaction
Lubricating oils
Perovskite-type crystals

Henderson

Synthesis gas
(integrated process of two-stage fixed bed syngas prodn. and F-T
synthesis for GTL in remote gas field)

IT 7631-86-9, Silica, uses
RL: CAT (Catalyst use); USES (Uses)
(Ce/Co promoted; integrated process of two-stage fixed bed syngas
prodn. and F-T synthesis for GTL in remote gas field)

IT 173558-62-8, Aluminum magnesium oxide (Al_2MgO_3)
RL: CAT (Catalyst use); USES (Uses)
(La_2O_3 -promoted; integrated process of two-stage fixed bed syngas
prodn. and F-T synthesis for GTL in remote gas field)

IT 7440-02-0, Nickel, uses
RL: CAT (Catalyst use); USES (Uses)
(doped La_2O_3 -promoted MgAl_2O_3 , FT catalyst; integrated process of
two-stage fixed bed syngas prodn. and F-T synthesis for GTL in
remote
gas field)

IT 7440-06-4, Platinum, uses
RL: CAT (Catalyst use); USES (Uses)
(loaded with palladium on γ -alumina, methane oxidn. catalyst;
integrated process of two-stage fixed bed syngas prodn. and F-T
synthesis for GTL in remote gas field)

IT 7440-05-3, Palladium, uses
RL: CAT (Catalyst use); USES (Uses)
(loaded with platinum on γ -alumina, methane oxidn. catalyst;
integrated process of two-stage fixed bed syngas prodn. and F-T
synthesis for GTL in remote gas field)

IT 112510-19-7, Calcium lanthanum manganese oxide ($\text{Ca}_{0.3}\text{La}_{0.7}\text{MnO}_3$)
529487-74-9, Calcium iron lanthanum manganese oxide
($\text{Ca}_{0.3}\text{Fe}_{0.3}\text{La}_{0.7}\text{Mn}_{0.7}\text{O}_3$)
RL: CAT (Catalyst use); USES (Uses)
(methane oxidn. catalyst; integrated process of two-stage fixed bed
syngas prodn. and F-T synthesis for GTL in remote gas field)

IT 1312-81-8, Lanthanum oxide (La_2O_3)
RL: CAT (Catalyst use); USES (Uses)
(promoted MgAl_2O_3 ; integrated process of two-stage fixed bed syngas
prodn. and F-T synthesis for GTL in remote gas field)

IT 7440-45-1, Cerium, uses 7440-48-4, Cobalt, uses
RL: CAT (Catalyst use); USES (Uses)
(silica promoted with Ce/Co; integrated process of two-stage
fixed bed syngas prodn. and F-T synthesis for GTL in remote gas
field)

IT 1344-28-1, Alumina, uses
RL: CAT (Catalyst use); USES (Uses)
(γ -, Pd-Pt loaded, support, methane oxidn. catalyst; integrated

process of two-stage fixed bed syngas prodn. and F-T synthesis for
GTL in remote gas field)

L53 ANSWER 4 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2003:170878 Document No. 138:371364 Electron-microscopy study
multicomponent

Ce/ θ -Al₂O₃ oxide methane combustion catalysts. Komashko, L. V.;
Zheksenbaeva, Z. T.; Popova, N. M.; Dosumov, K. D. (Inst. Org.

Kataliza

Elektrokhim. im. D. V. Sokol'skogo, MON RK, Almaty, Kazakhstan).
Izvestiya Ministerstva Obrazovaniya i Nauki Respubliki Kazakhstan,
Natsional'noi Akademii Nauk Respubliki Kazakhstan, Seriya

Khimicheskaya

(6), 68-72 (Russian) 2002. CODEN: IMSKFR. ISSN: 1025-9341.

Publisher:

Nauchno-Izdatel'skii Tsentr "Gylym".

AB The morphol. and compn. of 2%Ce- modified θ - Al₂O₃
methane multicomponent combustion catalysts NiCuCr, MnBaSrCeLa after
calcination to 1200 ° and **promoted** with traces of Pt
(0.1-0.3%), **Pd** (0.05%), were studied with the aid of electron
diffraction microscopy. The results are presented here. It was
discovered that Mn-rare earth element-alk. earth element catalysts, in
contrast to the NiCuCr contact, after high temp. processing in air, is
organized into aluminate structures MeAl₂O₄, Me₂AlO₄, and appears as
manganese hexaaluminate like LaMnAl₁₁O₁₉. This catalyst is an active
methane combustion catalyst.

IT 7440-05-3, Palladium, uses

RL: CAT (Catalyst use); USES (Uses)

(metal **promoter** in Ce/ θ - Al₂O₃;

electron-microscopy study of multicomponent Ce/ θ -
Al₂O₃ -metal oxide methane combustion catalysts)

RN 7440-05-3 CAPLUS

CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

CC 51-12 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67

IT Oxides (inorganic), uses
Transition metal oxides

RL: CAT (Catalyst use); USES (Uses)

(phases in calcined catalyst; electron-microscopy study of

Henderson

- multicomponent Ce/θ-Al₂O₃ -metal oxide methane combustion catalysts)
- IT 7439-91-0, Lanthanum, uses 7439-96-5, Manganese, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-24-6, Strontium, uses 7440-39-3, Barium, uses 7440-47-3, Chromium, uses 7440-50-8, Copper, uses
- RL: CAT (Catalyst use); USES (Uses)
(metal promoter in Ce/θ- Al₂O₃;
electron-microscopy study of multicomponent Ce/θ-Al₂O₃ -metal oxide methane combustion catalysts)
- IT 12014-44-7, Cerium aluminate (CeAlO₃)
- RL: CAT (Catalyst use); USES (Uses)
(phase in calcined catalyst, phase in calcined catalyst, phase in calcined catalyst; electron-microscopy study of multicomponent Ce/θ-Al₂O₃ -metal oxide methane combustion catalysts)
- IT 522613-37-2, Aluminum lithium manganese oxide (Al₁₁LiMnO₁₉)
- RL: CAT (Catalyst use); USES (Uses)
(phase in calcined catalyst, phase in calcined catalyst;
electron-microscopy study of multicomponent Ce/θ-Al₂O₃ -metal oxide methane combustion catalysts)
- IT 1304-28-5, Barium oxide, uses 1306-38-3, Cerium dioxide (CeO₂), uses 1308-38-9, Chromium oxide (Cr₂O₃), uses 1313-13-9, Manganese dioxide (MnO₂), uses 1314-06-3, Nickel oxide (Ni₂O₃) 1314-08-5, Palladium oxide (PdO) 1314-11-0, Strontium oxide, uses 1317-34-6, Manganese oxide (Mn₂O₃) 1317-35-7, Manganese oxide (Mn₃O₄) 1317-38-0, Copper oxide (CuO), uses 1317-39-1, Copper oxide (Cu₂O), uses 1333-82-0, Chromium oxide (CrO₃) 1345-13-7, Cerium oxide (Ce₂O₃) 7787-35-1, Barium manganese oxide (BaMnO₄) 7787-36-2, Barium manganate (Ba(MnO₄)₂)
- 12003-21-3, AlCu 12003-65-5, Aluminum lanthanum oxide (AlLaO₃)
12004-35-2, Nickel aluminum oxide (NiAl₂O₄) 12018-01-8, Chromium oxide
(CrO₂) 12018-18-7, Nickel chromium oxide (NiCr₂O₄) 12035-82-4, Platinum oxide (PtO) 12042-92-1, Aluminum copper oxide (Al₂CuO₄)
12068-52-9, Aluminum manganese oxide (MnAl₂O₄) 12142-67-5, LaPt
12163-45-0, Manganese strontium oxide (SrMnO₃) 12209-30-2, Manganese nickel oxide (MnNiO₃) 12250-93-0, Copper aluminum oxide (CuAlO₂)
12254-24-9, Aluminum strontium oxide (Al₁₂SrO₁₉) 12359-17-0, Nickel oxide (Ni₂O) 12394-76-2, Chromium nickel oxide (CrNiO₃)
13548-42-0,
Chromium Copper oxide (CrCuO₄) 14721-18-7 39354-08-0, Nickel aluminate
53169-13-4, Aluminum manganese oxide (AlMn₂O₄) 522613-26-9, Aluminum copper oxide (AlCuO₄) 522613-28-1, Aluminum nickel oxide (Al₂₆NiO₄₂)
522613-29-2, Aluminum nickel oxide (Al₂NiO₃) 522613-30-5, Chromium

copper manganese oxide ($\text{Cr}_{1.7}\text{CuMn}_{0.9}\text{O}_4$) 522613-31-6, Aluminum
manganese
oxide (AlMnO_4) 522613-32-7, Aluminum nickel oxide ($\text{Al}_{12}\text{NiO}_{49}$)
522613-33-8, Aluminum manganese oxide (AlMnO_3) 522613-35-0,
Manganese
nickel oxide (MnNiO_4) 522613-39-4, Barium manganese oxide (BaMn_2O_4)
RL: **CAT (Catalyst use)**; USES (Uses)
(phase in calcined catalyst; electron-microscopy study of
multicomponent Ce/ θ - Al_2O_3 -metal oxide methane combustion
catalysts)
IT 1344-70-3, Copper oxide 11099-02-8, Nickel oxide 11118-57-3,
Chromium
oxide 11129-18-3, Cerium oxide 39427-01-5, Copper aluminate
RL: **CAT (Catalyst use)**; USES (Uses)
(phases in calcined catalyst; electron-microscopy study of
multicomponent Ce/ θ - Al_2O_3 -metal oxide methane combustion
catalysts)
IT 1344-28-1, Aluminum oxide (Al_2O_3), uses
RL: **CAT (Catalyst use)**; USES (Uses)
(θ -, modified with Ce; electron-microscopy study of
multicomponent Ce/ θ - Al_2O_3 -metal oxide methane combustion
catalysts)
IT 7440-45-1, Cerium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(θ - Al_2O_3 - modified with; electron-microscopy study of
multicomponent Ce/ θ - Al_2O_3 -metal oxide methane combustion
catalysts)

L53 ANSWER 5 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:868815 Document No. 137:372377 High surface area, small crystallite
size catalyst for **Fischer-Tropsch** synthesis. Hu, X.
D.; Loi, Patrick J.; O'Brien, Robert J. (Sud-Chemie, Inc., USA). PCT

Int.
Appl. WO 2002089978 A1 20021114, 49 pp. DESIGNATED STATES: W: AE,
AG,
AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ,
DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,
IN,
IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,
MK,
MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK,
SL,
TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY,
KG,

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KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE,
DK,
ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN,
TD,
TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-US14095
20020506. PRIORITY: US 2001-851177 20010508.

AB The present development is a transition metal-based catalyst having a
high
surface area, a smooth, homogeneous surface morphol., an essentially
uniform distribution of cobalt throughout the support, and a small
metal
crystallite size. The high surface area transition metal-based
catalysts
of the present invention are prep'd. in a non-acidic soln. at a pH
greater
than .apprx.7.0, and starting with a non-acidic transition metal
complex.
The resulting product is a catalyst with a uniform distribution of
metal
throughout the catalyst particles, with a smooth and homogeneous
surface
morphol., and with slow crystallite growth upon heating.

IT 1344-28-1, Alumina, uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst support; high surface area, small crystallite size
catalyst
for Fischer-Tropsch synthesis)

RN 1344-28-1 CAPLUS
CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT 7440-05-3, Palladium, uses 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); USES (Uses)
(high surface area, small crystallite size catalyst for Fischer
-Tropsch synthesis)

RN 7440-05-3 CAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

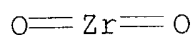
Pd

RN 7440-18-8 CAPLUS
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Henderson

Ru

IT 1314-23-4, Zirconium oxide, uses 7440-45-1,
 Cerium, uses
 RL: CAT (Catalyst use); USES (Uses)
 (promoter; high surface area, small crystallite size catalyst
 for Fischer-Tropsch synthesis)
 RN 1314-23-4 CAPLUS
 CN Zirconium oxide (ZrO₂) (8CI, 9CI) (CA INDEX NAME)



RN 7440-45-1 CAPLUS
 CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IC ICM B01J029-06
 ICS B01J029-064; B01J029-068; B01J029-072; B01J029-076; B01J021-02;
 B01J021-04; B01J021-06; B01J021-10; B01J021-12; B01J023-02;
 B01J023-04; B01J023-06; B01J023-10; B01J023-12; B01J023-16;
 B01J023-22; B01J023-24; B01J023-26; B01J023-28
 CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
 Section cross-reference(s): 67
 ST Fischer Tropsch catalyst transition metal complex
 IT Clays, uses
 RL: CAT (Catalyst use); USES (Uses)
 (attapulgitic, catalyst support; high surface area, small
 crystallite
 size catalyst for Fischer-Tropsch synthesis)
 IT Clays, uses
 Diatomite
 Silicalites (zeolites)
 Silicates, uses
 Y zeolites
 Zeolites (synthetic), uses
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst support; high surface area, small crystallite size
 catalyst)

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for Fischer-Tropsch synthesis)

IT Fischer-Tropsch catalysts
 Fischer-Tropsch reaction
 (high surface area, small crystallite size catalyst for Fischer-Tropsch synthesis)

IT Transition metal complexes
 Transition metals, uses
 RL: CAT (Catalyst use); USES (Uses)
 (high surface area, small crystallite size catalyst for Fischer-Tropsch synthesis)

IT Rare earth metals, uses
 RL: CAT (Catalyst use); USES (Uses)
 (promoter; high surface area, small crystallite size catalyst for Fischer-Tropsch synthesis)

IT 1313-96-8, Niobia 1314-13-2, Zinc oxide, uses 1314-20-1, Thoria, uses
 1343-88-0, Magnesium silicate 1344-28-1, Alumina, uses
 7631-86-9, Silica, uses 12173-98-7, Mordenite 12304-65-3,
 Hydrotalcite
 21645-51-2, Alumina trihydrate, uses 24623-77-6, Alumina monohydrate
 159995-97-8, Aluminum silicon oxide
 RL: CAT (Catalyst use); USES (Uses)
 (catalyst support; high surface area, small crystallite size catalyst
 for Fischer-Tropsch synthesis)

IT 60-00-4D, Ethylenedinitrilo tetraacetic acid, complexes with cobalt (II)
 71-50-1D, Acetate, complexes with cobalt (II) 107-15-3D,
 1,2-Diaminoethane, complexes with cobalt (II) 110-86-1D, Pyridine,
 complexes with cobalt (II) 111-40-0D, Diethylenetriamine, complexes
 with cobalt (II) 112-24-3D, complexes with cobalt (II) 123-54-6D,
 2,4-Pentanedione, complexes with cobalt (II) 144-62-7D, Oxalic acid,
 complexes with cobalt (II) 603-35-0D, Triphenylphosphine, complexes
 with cobalt (II) 1314-68-7D, Rhenium (VII) oxide, complexes with cobalt (II)
 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-98-7,
 Molybdenum,
 uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3,
 , Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium,
 uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-33-7,
 Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses
 7440-50-8, Copper, uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc,

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uses 7664-41-7D, Ammonia, complexes with cobalt (II) 7732-18-5D, Water, complexes with cobalt (II) 12648-47-4D, Platinum chloride, complexes with cobalt (II) 13933-32-9D, complexes with cobalt (II) 16887-00-6D, Chloride ion, complexes with cobalt (II) 20634-12-2D, complexes with cobalt (II) 22541-53-3D, complexes, uses
34513-98-9D,
Ruthenium nitrosyl nitrate, complexes with cobalt (II) 93687-50-4, Hexaammine cobalt carbonate
RL: **CAT (Catalyst use); USES (Uses)**
(high surface area, small crystallite size catalyst for **Fischer-Tropsch** synthesis)
IT 1309-48-4, Magnesium oxide, uses 1313-59-3, Sodium oxide, uses **1314-23-4**, Zirconium oxide, uses 7429-91-6, Dysprosium, uses 7439-91-0, Lanthanum, uses 7439-94-3, Lutetium, uses 7439-96-5, Manganese, uses 7440-00-8, Neodymium, uses 7440-09-7, Potassium, uses
7440-10-0, Praseodymium, uses 7440-12-2, Promethium, uses
7440-19-9,
Samarium, uses 7440-20-2, Scandium, uses 7440-24-6, Strontium, uses
7440-27-9, Terbium, uses 7440-30-4, Thulium, uses 7440-42-8,
Boron,
uses **7440-45-1, Cerium**, uses 7440-46-2, Cesium, uses 7440-52-0, Erbium, uses 7440-53-1, Europium, uses 7440-54-2, Gadolinium, uses 7440-60-0, Holmium, uses 7440-64-4, Ytterbium, uses
7440-65-5, Yttrium, uses 12136-45-7, Potassium oxide, uses
13463-67-7,
Titanium oxide, uses 18088-11-4, Rubidium oxide 20281-00-9, Cesium oxide
RL: **CAT (Catalyst use); USES (Uses)**
(**promoter**; high surface area, small crystallite size catalyst for **Fischer-Tropsch** synthesis)

L53 ANSWER 6 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:725766 Document No. 137:219316 Preparation of **Fischer-Tropsch** catalysts. Zennaro, Roberto; Pederzani, Giovanni; Bellussi, Giuseppe (Enitecnologie S.p.A., Italy). Ital. Appl. IT 2000MI1167 A1 20011126, 30 pp. (Italian). CODEN: ITXXCZ.

APPLICATION:

IT 2000-MI1167 20000526.

AB A procedure for prepn. of **Fischer-Tropsch** catalysts involves (1) prepn. of a catalyst precursor contg. 1 or more Group VIII metal(s) in form of oxides supported on inert supports (e.g., SiO₂,

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Al₂O₃), (2) redn. of the oxides from the step 1 to obtain the catalyst contg. 1 or more Group VIII metal(s) on the inert support, and (3) impregnation of the catalyst from the step 2 for re-oxidn. prevention by

treatment with a hydrocarbon fraction b. 30-130° (preferably 60-100°) and contg. S <5, Cl <5, and N <5 ppm in a liq. state and successive solidification at 20-25°. Preferably, C₂₀-40 alkanes are used as the hydrocarbon fraction. The Group VIII metals contain ≥80% Co.

IT 7440-18-8, Ruthenium, uses 7440-45-1, Cerium, uses

RL: CAT (Catalyst use); MOA (Modifier or additive use); USES (Uses)

(promoter in prepn. of cobalt-based Fischer-Tropsch catalysts)

RN 7440-18-8 CAPLUS

CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-45-1 CAPLUS

CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT 1344-28-1, Alumina, uses

RL: CAT (Catalyst use); TEM (Technical or engineered material use); USES (Uses)

(support in prepn. of Fischer-Tropsch catalysts)

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM C07C

CC 51-9 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 67

ST Fischer Tropsch catalyst prepn paraffin wax impregnation

IT Alkanes, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(C₂₀-40; in impregnation of Fischer-Tropsch

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- catalysts)
- IT Paraffin waxes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(in impregnation of **Fischer-Tropsch** catalysts)
- IT Group VIII elements
RL: TEM (Technical or engineered material use); USES (Uses)
(in prepn. of **Fischer-Tropsch** catalysts)
- IT **Fischer-Tropsch** catalysts
(prepn. of)
- IT Rare earth metals, uses
RL: MOA (Modifier or additive use); USES (Uses)
(promoter in prepn. of cobalt-based **Fischer-Tropsch** catalysts)
- IT 7440-48-4, Cobalt, uses
RL: **CAT (Catalyst use)**; TEM (Technical or engineered material use); USES (Uses)
(in prepn. of **Fischer-Tropsch** catalysts)
- IT 7439-91-0, Lanthanum, uses 7439-95-4, Magnesium, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-09-7, Potassium, uses
7440-15-5, Rhenium, uses 7440-18-8, Ruthenium, uses 7440-21-3, Silicon, uses 7440-23-5, Sodium, uses 7440-24-6, Strontium, uses 7440-25-7, Tantalum, uses 7440-29-1, Thorium, uses 7440-31-5, Tin, uses 7440-33-7, Tungsten, uses 7440-39-3, Barium, uses 7440-45-1, Cerium, uses 7440-50-8, Copper, uses 7440-58-6, Hafnium, uses 7440-61-1, Uranium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-70-2, Calcium, uses
RL: **CAT (Catalyst use)**; MOA (Modifier or additive use); USES (Uses)
(promoter in prepn. of cobalt-based **Fischer-Tropsch** catalysts)
- IT 1344-28-1, Alumina, uses 7631-86-9, Silica, uses
RL: **CAT (Catalyst use)**; TEM (Technical or engineered material use); USES (Uses)
(support in prepn. of **Fischer-Tropsch** catalysts)

L53 ANSWER 7 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:461818 Document No. 137:371654 Modification of catalytic properties of
Pd/Al₂O₃ by rare earth addition: Catalytic activity and selectivity in **methanol** decomposition. Cheng, Yang; Ren, Jie; Sun, Yuhuan (State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, 030001, Peop. Rep. China). Zhongguo Xitu

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Xuebao, 20(2), 176-178 (Chinese) ^{Not PA} (2002.) CODEN: ZXXUE5. ISSN: 1000-4343.

Publisher: Yejin Gongye Chubanshe.

AB A series of **Pd** catalyst supported by **CeO₂**- and **La₂O₃**- modified γ - **Al₂O₃** was prep'd. for **methanol** decompn. The catalytic properties were investigated and the effect of the following parameters was addressed: (1) Precursor salt of **Pd** (chloride or nitrate). (2) Rare earth nature (**La** and/or **Ce**). (3) Rare earth content (0 .apprx. 30%). (4) Impregnation mode (successive

impregnations

or co-impregnation). A synergistic effect between **CeO₂** and **La₂O₃** on γ - **Al₂O₃** is obsd. for **promoting** the catalytic properties of **Pd**, which results in high activity and selectivity for **methanol** decompn. into **CO** and **H₂**. For a **methanol** LHSV of 1.8 h⁻¹, at 250° **methanol** conversion reaches 91.4% with almost 100% selectivity of **H₂** and **CO**.

IT 67-56-1, **Methanol**, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(modification of catalytic properties of **Pd/Al₂O₃** by rare earth

addn

for **methanol** decompn.)

RN 67-56-1 CAPLUS

CN **Methanol** (8CI, 9CI) (CA INDEX NAME)

H₃C-OH

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
Section cross-reference(s): 78

ST rare earth modification palladium alumina catalyst **methanol**
decompn

IT Decomposition catalysts

(modification of catalytic properties of **Pd/Al₂O₃** by rare earth

addn

for **methanol** decompn.)

IT 1306-38-3, Cerium dioxide, uses 1312-81-8, Lanthanum oxide
7440-05-3,

Palladium, uses 10099-59-9, Lanthanum nitrate 10108-73-3, Cerium
nitrate

RL: CAT (Catalyst use); USES (Uses)

(modification of catalytic properties of **Pd/Al₂O₃** by rare earth

addn

for **methanol** decompn.)

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- IT 67-56-1, **Methanol**, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(modification of catalytic properties of Pd/Al₂O₃ by rare earth addn for **methanol** decompn.)
- IT 1344-28-1, **Alumina**, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(γ ; modification of catalytic properties of Pd/Al₂O₃ by rare earth addn for **methanol** decompn.)
- L53 ANSWER 8 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:312468 Document No. 137:22168 Promotion effects of CeO₂ and Pd on Ni/ γ -Al₂O₃ catalyst. Yang, Yong-Lai; Xu, Heng-Yong; Li, Wen-Zhao (Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian, 116023, Peop. Rep. China). Wuli Huaxue Xuebao, 18(4), 321-325 (Chinese) 2002. CODEN: WHXUEU. ISSN: 1000-6818. Publisher: Beijing Daxue Chubanshe.
- AB The influence of the addn. of n-type semiconductor oxide CeO₂ and noble metal Pd to Ni/ γ - Al₂O₃ catalyst on carbon deposition by CH₄ and carbon elimination by CO₂ was studied by using a pulse micro-reaction as well as BET, TPR, CO₂-TPSR and hydrogen chemisorption techniques. It was found that, the addn. of n-type semiconductor CeO₂ to Ni/ γ - Al₂O₃ catalyst could decrease carbon deposition activity of CH₄ and increase carbon elimination ability of CO₂; the addn. of noble metal Pd could further alter the interaction between support Al₂O₃, promoter CeO₂ and active phase Ni, as a result, the performance of resistance to carbon deposition of Ni/ γ - Al₂O₃ catalyst was improved. At the same time, a new explanation for the above promoting effect was put forward by the models of carbon deposition by CH₄ and carbon elimination by CO₂ on the Ni-Ce-Pd/ γ - Al₂O₃ catalyst.
- CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67
- ST cerium oxide palladium nickel alumina methane **reforming** catalyst
- IT **Reforming** catalysts
(promotion effects of CeO₂ and Pd on Ni/ γ -Al₂O₃ catalyst)
- IT 1306-38-3, **Cerium** oxide (CeO₂), uses 1344-28-1, Alumina, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(promotion effects of CeO₂ and Pd on Ni/ γ - Al₂O₃ catalyst)

L53 ANSWER 9 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2002:160316 Document No. 136:206040 Catalysts showing high thermal
conductivity and their manufacture. Shiizaki, Shinji; Nagashima,
Ikuo;
Kameyama, Hideo (Kawasaki Heavy Industries, Ltd., Japan). Jpn. Kokai
Tokkyo Koho JP 2002066337 A2 20020305, 9 pp. (Japanese). CODEN:
JKXXAF.

APPLICATION: JP 2000-262454 20000831.

AB The substrate having an alumina layer, formed by anodization, is
dipped in
a soln. contg. weak acid or alkali and a catalyst for enlargement of
the
alumina pore diam. and for deposition of the catalysts in the pores
and
then treated for removal of the alumina layer to obtain a catalyst
layer.

Enlargement of alumina **pore size** may be carried out by
treatment with alkali or acid. A support substance may be added to
the
above stated dipping soln., instead of the catalysts, for formation
of a
support layer on the substrate, followed by application of catalyst
metals
thereon. Thus prepd. catalysts are also claimed. Heat transfer in
catalytic processes are carried out under high efficiency. The
catalysts

are suitable for use in endo- or exothermic catalytic reactions.

IT 1314-13-2, Zinc oxide, uses

RL: CAT (Catalyst use); PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)
(catalyst support; formation of catalyst layers on thermal

conductors

by using anodized alumina layers)

RN 1314-13-2 CAPLUS

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O==Zn

IT 7440-05-3, Palladium, uses

RL: CAT (Catalyst use); PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)

(catalyst; formation of catalyst layers on thermal conductors by
using

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anodized alumina layers)
RN 7440-05-3 CAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IT 67-56-1, **Methanol**, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(decompn. of; formation of catalyst layers on thermal conductors by
using anodized alumina layers)
RN 67-56-1 CAPLUS
CN Methanol (8CI, 9CI) (CA INDEX NAME)

H₃C-OH

IC ICM B01J037-00
ICS B01J023-44; B01J037-02; C25D011-18; C25D011-24
CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
Section cross-reference(s): 51
IT Zeolites (synthetic), uses
RL: **CAT (Catalyst use)**; PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)
(catalyst support; formation of catalyst layers on thermal
conductors
by using anodized alumina layers)
IT Anodization
Catalysts
Heat transfer
Reforming catalysts
Thermal conductors
(formation of catalyst layers on thermal conductors by using
anodized
alumina layers)
IT 1302-88-1, Cordierite 1306-38-3, Ceria, uses 1309-48-4, Magnesium
oxide, uses **1314-13-2**, Zinc oxide, uses 1314-23-4, Zirconia,
uses 1332-29-2, Tin oxide 1332-37-2, Iron oxide, uses 7631-86-9,
Silica, uses 11098-99-0, Molybdenum oxide 11099-11-9, Vanadium
oxide
11118-57-3, Chromium oxide 13463-67-7, Titania, uses
RL: **CAT (Catalyst use)**; PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)

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(catalyst support; formation of catalyst layers on thermal conductors

by using anodized alumina layers)

IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-96-5,

Manganese,

uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses

7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6,

Rhodium,

uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses

7440-31-5,

Tin, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses

7440-57-5,

Gold, uses 7440-66-6, Zinc, uses

RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(catalyst; formation of catalyst layers on thermal conductors by using

anodized alumina layers)

IT 67-56-1, Methanol, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(decompn. of; formation of catalyst layers on thermal conductors by using anodized alumina layers)

IT 37321-70-3, Al₂O₃

RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(formation of catalyst layers on thermal conductors by using anodized

alumina layers)

L53 ANSWER 10 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN

2002:100383 Document No. 136:328065 Synergistic promotion of CeO₂ and La₂O₃

in Pd/Al₂O₃ catalysts for methanol decomposition. Yang, Cheng;

Ren, Jie; Sun, Yuhua (State Key Laboratory of Coal Conversion,

Institute

of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, 030001, Peop.

Rep. China). Catalysis Communications, 2(11-12), 353-356 (English)

2001.

CODEN: CCAOAC. ISSN: 1566-7367. Publisher: Elsevier Science B.V..

AB Pd catalysts supported on CeO₂- and La₂O₃-modified γ -Al₂O₃ were

prepd. for MeOH decomn. to CO and H₂ for fuel cell applications.

The CeO₂ and La₂O₃ promote the catalytic activity of the Pd catalysts for

MeOH decomn.

IT 67-56-1, Methanol, reactions

Henderson

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent) (activity of CeO₂- and La₂O₃-promoted Pd/Al₂O₃ catalysts for MeOH decompn. to fuel gases for fuel cell applications)

RN 67-56-1 CAPLUS

CN Methanol (8CI, 9CI) (CA INDEX NAME)

H₃C—OH

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST cerium oxide promoted palladium catalyst **methanol** decompn;
lanthanum oxide promoted palladium catalyst **methanol** decompn;
fuel cell application **methanol** decompn catalyst

IT Decomposition catalysts

Fuel cells

Fuel gases

(activity of CeO₂- and La₂O₃-promoted Pd/Al₂O₃ catalysts for MeOH decompn. to fuel gases for fuel cell applications)

IT 1306-38-3, **Cerium** oxide, uses 1312-81-8, Lanthanum oxide
7440-05-3, Palladium, uses

RL: CAT (Catalyst use); USES (Uses)

(activity of CeO₂- and La₂O₃-promoted Pd/

Al₂O₃ catalysts for MeOH decompn. to fuel gases for fuel cell applications)

IT 67-56-1, **Methanol**, reactions

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent) (activity of CeO₂- and La₂O₃-promoted Pd/Al₂O₃ catalysts for MeOH decompn. to fuel gases for fuel cell applications)

L53 ANSWER 11 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN

2002:51892 Document No. 136:120909 Chromium-based mixed oxides as catalysts

for converting C1-5-hydrocarbons to syngas. Kourtakis, Kostantinos; Gaffney, Anne M.; Wang, Lin (USA). U.S. Pat. Appl. Publ. US

2002006374 A1

20020117, 30 pp., Cont.-in-part of U.S. Ser. No. 703,701. (English).

CODEN: USXXCO. APPLICATION: US 2001-785384 20010216. PRIORITY: US

1999-PV163843 19991105; US 2000-PV183423 20000218; US 2000-PV183575

20000218; US 2000-703701 20001101.

AB A chromium-based mixed oxide is used for the catalytic conversion of C1-5-hydrocarbons to carbon monoxide and hydrogen under partial oxidn. **promoting** conditions. The mixed oxide catalyst contains at least

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one other metal, such as Li, Na, K, Rb, Cs, Mg, Ca, Sr, Ba, Cu, Ag, Au, Zn, Cd, La, **Ce**, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Co, Ni, **Ru**, or Rh and has a structure other than perovskite. The catalyst can also contain magnesia, silica, titanium dioxide, tantalum oxide, **zirconia** or **alumina** as an oxidatively and thermally stable porous support in form of a three-dimensional monolith, reticulated ceramic, or ceramic foam, or for forming a xerogel or aerogel as a matrix (at least 30 wt.% of total wt.). These gels are prep'd. by reacting metal C1-4-alkoxides, such as tantalum n-butoxide, titanium isopropoxide, and zirconium isopropoxide, with water at a molar ratio of 1:0.1-10. The syngas prodn. process is carried out at 700-1,000°C, 130-10,000 kPa, and a space velocity of the reaction mixt. of 50,000-50,000,000 NL/kg/h with a catalyst contact time of ≤ 10 ms. The reactant gas mixt. has a C:O ratio of about 2:1 and contains at least 80 vol.% of methane.

IC ICM C01B031-18
ICS C01B003-26; B01J023-26

NCL 423418200

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67

IT Alkali metal oxides
Alkaline earth oxides
Rare earth oxides
Transition metal oxides
RL: **CAT (Catalyst use)**; USES (Uses)
(mixed oxide catalyst contg.; chromium-based mixed oxides as catalysts for converting C1-5 hydrocarbons to syngas)

IT 59165-25-2, Chromium Cobalt lanthanum oxide
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst; chromium-based mixed oxides as catalysts for converting C1-5 hydrocarbons to syngas)

IT 11104-65-7P, Chromium copper oxide 12016-69-2P, Chromium cobalt oxide
(Cr₂CoO₄) 12619-67-9P, Chromium magnesium oxide 12640-79-8P,

Nickel tungsten oxide 12673-58-4P, Molybdenum Nickel oxide 12687-47-7P,
Chromium nickel oxide 12737-27-8P, Chromium iron oxide 12771-00-5P,

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Copper tungsten oxide 12777-94-5P, Chromium Lanthanum oxide
13762-14-6P, Cobalt molybdenum oxide (CoMoO4) 39318-26-8P, Chromium
vanadium oxide 39432-73-0P, Chromium manganese oxide 39455-56-6P,
Chromium tungsten oxide 50922-29-7P, Chromium zinc oxide
51142-84-8P,
Copper Molybdenum oxide 51845-82-0P, Cerium chromium oxide
56214-02-9P, Chromium samarium oxide 181790-65-8P, Chromium cobalt
titanium oxide 200711-37-1P, Chromium lanthanum nickel oxide
204759-73-9P, Chromium magnesium silicon oxide 356068-71-8P,
Aluminum
chromium gold oxide 356068-72-9P, Chromium gold magnesium oxide
356068-74-1P, Chromium nickel yttrium oxide 356068-75-2P, Cerium
chromium nickel oxide 356068-76-3P, Chromium magnesium hydroxide
oxide
389964-31-2P, Chromium lanthanum lithium oxide
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(catalyst; chromium-based mixed oxides as catalysts for converting
C1-5
hydrocarbons to syngas)
IT 1308-38-9P, Dichromium trioxide, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(freeze-dried or aerogel, catalyst; chromium-based mixed oxides as
catalysts for converting C1-5 hydrocarbons to syngas)
IT 546-68-9, Titanium isopropoxide 2171-98-4, Zirconium isopropoxide
51094-78-1, 1-Butanol, tantalum(5+) salt
RL: **CAT (Catalyst use)**; USES (Uses)
(gel formation using; chromium-based mixed oxides as catalysts for
converting C1-5 hydrocarbons to syngas)
IT 1304-28-5, Barium oxide, uses 1305-78-8, Calcium oxide, uses
1306-19-0, Cadmium oxide, uses 1308-87-8, Dysprosium oxide
1312-81-8,
Lanthanum oxide 1313-59-3, Sodium oxide, uses 1313-99-1, Nickel
oxide,
uses 1314-11-0, Strontium oxide, uses 1314-13-2, Zinc oxide, uses
1344-70-3, Copper oxide 11104-61-3, Cobalt oxide 11113-84-1,
Ruthenium
oxide 11129-18-3, Cerium oxide 12036-32-7, Praseodymium oxide
12057-24-8, Lithium oxide, uses 12061-16-4, Erbium oxide
12064-62-9,
Gadolinium oxide 12136-45-7, Potassium oxide, uses 12648-30-5,
Neodymium oxide 12651-06-8, Samarium oxide 12651-43-3, Ytterbium
oxide
12680-36-3, Rhodium oxide 12738-76-0, Terbium oxide 12770-85-3,

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Europium oxide 18088-11-4, Rubidium oxide 20281-00-9, Cesium oxide 20667-12-3, Silver oxide 39403-39-9, Gold oxide 39455-61-3, Holmium oxide 39455-67-9, Lutetium oxide 39455-81-7, Thulium oxide

RL: **CAT (Catalyst use)**; USES (Uses)
(mixed oxide contg.; chromium-based mixed oxides as catalysts for converting C1-5 hydrocarbons to syngas)

IT 1309-48-4, Magnesia, uses 1314-23-4, Zirconia, uses 1344-28-1, α -Alumina, uses 7631-86-9, Silica, uses 13463-67-7, Titanium oxide, uses 59763-75-6, Tantalum oxide

RL: **CAT (Catalyst use)**; USES (Uses)
(support; chromium-based mixed oxides as catalysts for converting C1-5 hydrocarbons to syngas)

L53 ANSWER 12 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2001:651734 Document No. 135:359351 Effect of the promotion of ceria on Pd/MgO catalyst for **methanol** synthesis. Imamura, Seiichiro; Denpo, Katsuaki; Kanai, Hiroyoshi; Yamane, Hideyuki; Saito, Yoshio; Utani, Kazunori; Matsumura, Yasuyuki (Faculty of Engineering and Design, Kyoto Institute of Technology, Kyoto, 606-8585, Japan). Sekiyu Gakkaishi, 44(5), 293-302 (English) 2001. CODEN: SKGSAE. ISSN: 0582-4664. Publisher: Sekiyu Gakkai.

AB The hydrogenation of CO was carried out over Pd supported on MgO. The addn. of various lanthanide oxides increased the activity of Pd/MgO to produce **methanol**. CeO₂ exhibited the highest **promoting** effect at a temp. as low as of 250°C and the optimum molar ratio of Ce/Pd was about unity. TPR expt. showed that CeO₂ on MgO (without Pd) suffered less redn. with hydrogen compared with that supported on Al₂O₃. Thus, the former retained the Ce(IV) state almost completely under the reducing condition, which was ascertained by XAFS measurement. XAFS anal. also indicated that Pd in Pd/MgO suffered redn. extensively while that in Pd/CeO₂/MgO partly retained the oxidized state owing to the redn.-resistant CeO₂ on MgO. The results of CO adsorption XPS, XAFS, and TEM measurement revealed that addn. of CeO₂ increased the dispersion of Pd metal particles. It was concluded that the high activity of the catalyst resulted from the combination of highly dispersed Pd metal and partly oxidized Pd component with a Pd-O bond.

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IT 67-56-1P, Methanol, preparation
 RL: SPN (Synthetic preparation); PREP (Preparation)
 (ceria promotion of Pd/MgO catalyst for methanol synthesis)
 RN 67-56-1 CAPLUS
 CN Methanol (8CI, 9CI) (CA INDEX NAME)

H₃C-OH

CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
 Section cross-reference(s): 52
 ST carbon monoxide hydrogenation catalyst methanol prepn
 IT 1306-38-3, Ceria, uses 7440-05-3, Palladium, uses
 RL: CAT (Catalyst use); USES (Uses)
 (ceria promotion of Pd/MgO catalyst for methanol synthesis)
 IT 630-08-0, Carbon monoxide, reactions
 RL: PEP (Physical, engineering or chemical process); RCT (Reactant);
 PROC (Process); RACT (Reactant or reagent)
 (ceria promotion of Pd/MgO catalyst for methanol synthesis)
 IT 67-56-1P, Methanol, preparation
 RL: SPN (Synthetic preparation); PREP (Preparation)
 (ceria promotion of Pd/MgO catalyst for methanol synthesis)

L53 ANSWER 13 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN

2001:146953 Document No. 134:254455 Methanol decomposition to
 synthesis gas at low temperature over palladium supported on
 ceria-zirconia solid solutions. Liu, Y.; Hayakawa, T.; Ishii, T.;
 Kumagai, M.; Yasuda, H.; Suzuki, K.; Hamakawa, S.; Murata, K.

(Chemical

Technology Division, Institute of Research and Innovation, Chiba,
 Kashiwa,

Takada, Japan). Applied Catalysis, A: General, 210(1,2), 301-314

(English) 2001. CODEN: ACAGE4. ISSN: 0926-860X. Publisher: Elsevier
 Science B.V..

AB The CexZr1-xO2 solid soln. was used as a support of a palladium
 catalyst for methanol decompn. to synthesis gas at low temp.
 All Pd-contg. catalysts tested in this study showed high
 selectivity to synthesis gas (over 96%). The Pd supported on
 the composite oxide with a Ce/Zr molar ratio of 4/1 exhibited
 the highest activity. Pd/Ce0.8Zr0.2O2 (17 wt. %) (Cop) (prepd.
 by copptn. method) showed a conversion of 51.2% for the methanol
 decompn. at 473 K, which was higher than those over 17 wt. % Pd
 /CeO2 (cop) (40.7%) and 17 wt. % Pd/ZrO2 (cop)

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(24.3%) at 473 K. The 17 wt. % Pd/Ce_{0.8}Zr_{0.2}O₂ (cop) catalyst showed a higher BET surface area and smaller Pd particles than those of 17 wt. % Pd/CeO₂ (cop). Moreover, a more active Pd.sigm.+ state could be maintained by Zr⁴⁺ ion modification due to **promotion** of the oxygen mobility and enhancement of the reducibility and increase in the acid sites of the CeO₂ support. The

17 wt.% Pd/Ce_{0.8}Zr_{0.2}O₂ (cop) catalyst showed a much higher conversion (51.2%) than that over 17 wt. % Pd/Ce_{0.8}Zr_{0.2}O₂ (imp) (prepd. by impregnation method) (17.2%) at 473 K. This is due to the 17 wt. % Pd/Ce_{0.8}Zr_{0.2}O₂ (cop) possessing many small Pd particles. The 17 wt.% Pd/Ce_{0.8}Zr_{0.2}O₂ (cop) catalyst showed an initial conversion of 51.2% at 473 K but the conversion decreased to 43.1% after 24 h on stream. This deactivation was attributed to carbonaceous deposit on the catalyst surface. The amts. of coke on the 17 wt. % Pd/Ce_{0.8}Zr_{0.2}O₂ (cop) catalyst were 0.9 wt. % After 24 h on stream at 473 K and 2.1 wt. % After 1 h on stream at 523 K.

IT 67-56-1, Methanol, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (methanol decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

RN 67-56-1 CAPLUS
 CN Methanol (8CI, 9CI) (CA INDEX NAME)

H₃C-OH

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
 ST methanol decompn catalysts palladium ceria zirconia syngas
 IT Decomposition catalysts
 Synthesis gas
 (methanol decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

IT 1306-38-3, Ceria, uses 1314-23-4, Zirconia, uses 7440-05-3, Palladium,
 uses
 RL: CAT (Catalyst use); USES (Uses)
 (methanol decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

IT 67-56-1, Methanol, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)

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(methanol decompn. to synthesis gas at low temp. over palladium supported on ceria-zirconia solid solns.)

L53 ANSWER 14 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2001:7599 Document No. 134:58950 Extended catalyst life in a two-stage
Fischer-Tropsch hydrocarbon synthesis process. Beer,
Gary L. (Syntroleum Corporation, USA). U.S. US 6169120 B1 20010102,
5 pp.
(English). CODEN: USXXAM. APPLICATION: US 1999-397474 19990917.
AB An extended catalyst life two-stage hydrocarbon synthesis process is
presented where a first synthesis gas stream is reacted in a
first-stage
reactor in the presence of a suitable catalyst (e.g., Co/alumina) to
produce liq. hydrocarbon products and a gaseous stream; the gaseous
stream
is cooled and water and liq. hydrocarbons are sepd. from the gaseous
stream to produce a second synthesis gas stream which is then passed
to a
second stage reactor for the prodn. of addnl. liq. hydrocarbons.
IT 7440-18-8, Ruthenium, uses 7440-45-1, Cerium,
uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst promoter; extended catalyst life in a two-stage
Fischer-Tropsch hydrocarbon synthesis process using)
RN 7440-18-8 CAPLUS
CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

RN 7440-45-1 CAPLUS
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IT 1344-28-1, Alumina, uses
RL: CAT (Catalyst use); USES (Uses)
(support; extended catalyst life in a two-stage **Fischer-**
Tropsch hydrocarbon synthesis process)
RN 1344-28-1 CAPLUS
CN Aluminum oxide (Al₂O₃) (8CI, 9CI) (CA INDEX NAME)

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*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM C07C027-00

NCL 518715000

CC 51-9 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 48, 67

ST **Fischer Tropsch** hydrocarbon manuf extended catalyst life

IT Reactors

(column, slurry-bubble; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)

IT **Fischer-Tropsch** catalysts

Synthesis gas

(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

IT Hydrocarbons, preparation

RL: IMF (Industrial manufacture); PREP (Preparation)

(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

IT **Fischer-Tropsch** reaction

(hydrocarbon-synthesis process using a two-stage)

IT Columns and Towers

(reactor, slurry-bubble; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)

IT 7727-37-9, Nitrogen, uses

RL: NUU (Other use, unclassified); USES (Uses)

(carrier; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)

IT 7440-15-5, Rhenium, uses 7440-18-8, Ruthenium, uses 7440-32-6, Titanium, uses 7440-45-1, Cerium, uses 7440-58-6,

Hafnium, uses 7440-61-1, Uranium, uses 7440-67-7, Zirconium, uses

RL: CAT (Catalyst use); USES (Uses)

(catalyst promoter; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process using)

IT 7440-48-4, Cobalt, uses

RL: CAT (Catalyst use); USES (Uses)

(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

IT 630-08-0, Carbon monoxide, reactions 1333-74-0, Hydrogen, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

IT 1344-28-1, Alumina, uses

RL: CAT (Catalyst use); USES (Uses)

(support; extended catalyst life in a two-stage **Fischer-Tropsch** hydrocarbon synthesis process)

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L53 ANSWER 15 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
2000:899081 Document No. 134:193065 Influence of Mg and Ce addition to
ruthenium based catalysts used in the selective hydrogenation of
 α,β -unsaturated aldehydes. Bachiller-Baeza, B.;
Rodriguez-Ramos, I.; Guerrero-Ruiz, A. (C.S.I.C. Campus de
Cantoblanco,
Instituto de Catalisis y Petroleoquimica, Madrid, 28049, Spain).
Applied
Catalysis, A: General, 205(1,2), 227-237 (English) 2001. CODEN:
ACAGE4.
ISSN: 0926-860X. OTHER SOURCES: CASREACT 134:193065. Publisher:
Elsevier
Science B.V..
AB Ce and Mg were used as **promoters** in two series of
Ru based catalysts supported on **alumina** (Al₂O₃)
) and activated carbon (AC). The catalysts were characterized by H₂
chemisorption and temp.-programmed redn. (TPR), and studied in the
crotonaldehyde (gas phase) and the citral (liq. phase) hydrogenations.
Addn. of MgO and CeO₂ decreased the catalytic activity in
crotonaldehyde
and citral hydrogenations. With regard to the selectivity towards
unsatd.
alcs., similar trends were obsd. for the two reactions. MgO did
not influence the selectivity, but CeO₂ increased the selectivity to
unsatd. **alcs.**, esp. on carbon supported catalyst. Bulk CeO₂ and
Ce/AC catalyst showed low activity but very high selectivity (93
and 100%, resp.) to the unsatd. **alcs.** Based on these results
and the calorimetric expts. of CO adsorption it was suggested that
defect
sites on the surface of the **promoter** are the active and highly
selective sites for unsatd. aldehydes due to their influence on the
C:O
bond activation.
CC 22-7 (Physical Organic Chemistry)
Section cross-reference(s): 30
IT 1306-38-3, Cerium dioxide, uses 1309-48-4, Magnesium oxide, uses
7440-18-8, Ruthenium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalysts in selective hydrogenation of α,β -unsatd.
aldehydes)
IT 6117-91-5P, Crotyl **alcohol**
RL: **SPN (Synthetic preparation)**; PREP (Preparation)
(catalysts in selective hydrogenation of α,β -unsatd.
aldehydes)

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L53 ANSWER 16 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN

1999:210576 Document No. 130:314085 Modification of the catalytic properties

of palladium by rare earth (La, Ce) addition, catalytic activity and selectivity in hydrocarbon conversion. Kili, K.; Le Normand, F. (Laboratoire d'Etudes de la Réactivité Catalytique des Surfaces et Interfaces (LERCSI), UMR CNRS-ULP-ECPM, Strasbourg, 67070, Fr.).

Journal

of Molecular Catalysis A: Chemical, 140(3), 267-285 (English) 1999. CODEN: JMCCF2. ISSN: 1381-1169. Publisher: Elsevier Science B.V..

AB Pd/Al₂O₃ catalysts modified by cerium or

lanthanum promoters are tested for hydrocarbon conversion: methylcyclopentane (MCP) hydrogenolysis, 2-methylpentane (2MP) isomerization and 3-methylhexane (3MH) hydrocracking,

dehydrocyclization

and aromatization. The following parameters are reviewed: (i)

precursor

salt of palladium (chloride or nitrate), (ii) rare earth nature (La or Ce), (iii) rare earth content within the range 0-100% and (iv) impregnation mode (coimpregnation or successive impregnations).

The

influence of chloride coming from the precursor salt of palladium on the catalytic behavior is strongly underlined. Chlorine anions are trapped by rare earth cations at the interface, as evidenced in a subsequent paper dealing with characterization studies of these same catalysts. Although the reactions readily occur on metallic sites, as evidenced by ¹³C labeled expts., the addn. of rare earth increases the activity and modifies the selectivity, esp. for 2MP isomerization.

These

changes are rationalized in terms of significant modification of the kinetic surface parameters (competitive hydrogen and hydrocarbon coverages). This is explained by (i) lowering of the hydrogen

coverage of

the palladium sites accompanying surface diffusion on the interface with the support and (ii) creation of new selective sites

at the

transition metal-rare earth interface. The other parameters

investigated

yield only minor changes of the catalytic behavior.

CC 51-6 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 67

ST petroleum reforming catalyst palladium cerium lanthanum

IT Aromatization catalysts

Hydrocracking catalysts

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Hydrogenolysis catalysts

Isomerization catalysts

Petroleum **reforming** catalysts

(modification of the catalytic properties of palladium by rare earth

(La, Ce) addn., catalytic activity and selectivity in hydrocarbon conversion)

IT 7439-91-0, Lanthanum, uses 7440-05-3, Palladium, uses 7440-45-1, Cerium, uses

RL: **CAT (Catalyst use)**; USES (Uses)

(modification of the catalytic properties of palladium by rare earth

(La, Ce) addn., catalytic activity and selectivity in hydrocarbon conversion)

L53 ANSWER 17 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN

1998:633231 Document No. 129:318254 Ruthenium catalysts for high temperature

solar **reforming** of methane. Berman, A.; Epstein, M. (Solar Research Facilities Unit, Weizmann Institute of Science, Israel).

Hydrogen Power: Theoretical and Engineering Solutions, Proceedings of the

HYPOTHESIS Symposium, 2nd, Grimstad, Norway, Aug. 18-22, 1997, Meeting Date 1997, 213-218. Editor(s): Saetre, T. O. Kluwer: Dordrecht,

Neth.

(English) 1998. CODEN: 66STAR.

AB The **reforming** of CH₄ with CO₂ on Ru/Al₂O₃

catalysts **promoted** with ceria is described. Effects of **Ce** on the activity and thermal stability of the catalysts were studied. Data for unpromoted Ru catalysts are given for comparison. The active centers of the **promoted Ru-Ce** catalyst supported on **alumina** have a dynamic structure which can be changed in the course of the reaction.

CC 49-1 (Industrial Inorganic Chemicals)

Section cross-reference(s): 51, 52, 67

ST solar **reforming** methane ruthenium catalyst

IT **Reforming**

Reforming catalysts

Solar energy

(ruthenium catalysts for high temp. solar **reforming** of methane)

IT 1344-28-1, Alumina, uses 7440-18-8, Ruthenium, uses

RL: **CAT (Catalyst use)**; USES (Uses)

(ruthenium catalysts for high temp. solar **reforming** of methane)

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- IT 1306-38-3, Ceria, uses
RL: CAT (Catalyst use); MOA (Modifier or additive use); USES (Uses)
(ruthenium catalysts for high temp. solar **reforming** of methane)
- IT 74-82-8, Methane, reactions 124-38-9, Carbon dioxide, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(ruthenium catalysts for high temp. solar **reforming** of methane)
- IT 1333-74-0P, Hydrogen, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(ruthenium catalysts for high temp. solar **reforming** of methane)
- L53 ANSWER 18 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1998:297866 Document No. 129:31593 Method for catalytic purification of combustion waste gases using **ethanol** with complete reaction.
Saito, Mika; Aoyama, Naoko; Yoshida, Kiyohide; Feng, Kei Sai (Tsusho Sangyosho Kiso Sangyo Kyoku, Japan). Jpn. Kokai Tokkyo Koho JP 10118459
A2 19980512 Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1996-295880 19961018.
- AB The method is carried out by arranging gas purifying agent along the exhaust gas passage, which comprises a 1st silver-contg. catalyst near the gas inlet and a 2nd tin-contg. catalyst near the gas outlet, for complete reaction of **ethanol** with NOx. The 1st catalyst is made of porous inorg. oxides (e.g., γ - **alumina**) loaded with silver or silver oxide, and the 2nd catalyst is made of porous inorg. oxides loaded with tin-contg. oxide and ≥ 1 transition metal(s) selected from platinum; **palladium**; **ruthenium**; gold; and iridium.
- IT 64-17-5, **Ethanol**, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(method for catalytic purifn. of combustion waste gases using **ethanol** with complete reaction)
- RN 64-17-5 CAPLUS
CN Ethanol (9CI) (CA INDEX NAME)

H₃C-CH₂-OH

- IC ICM B01D053-94
ICS B01D053-86; B01J023-14; B01J023-50; B01J023-54
- CC 59-3 (Air Pollution and Industrial Hygiene)
- ST waste combustion gas purifn catalyst **ethanol**; exhaust gas
nitrogen oxide removal catalyst
- IT Exhaust gases (engine)
Waste gases
(method for catalytic purifn. of combustion waste gases using
ethanol with complete reaction)
- IT 1344-28-1, γ -Alumina, uses 7439-88-5, Iridium, uses 7440-05-3,
Palladium, uses 7440-06-4, Platinum, uses 7440-18-8, Ruthenium,
uses 7440-22-4, Silver, uses 7440-57-5, Gold, uses 20667-12-3, Silver
oxide
RL: CAT (Catalyst use); USES (Uses)
(method for catalytic purifn. of combustion waste gases using
ethanol with complete reaction)
- IT 64-17-5, **Ethanol**, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or
chemical
process); PROC (Process); USES (Uses)
(method for catalytic purifn. of combustion waste gases using
ethanol with complete reaction)
- IT 11104-93-1, Nitrogen oxide, processes
RL: PEP (Physical, engineering or chemical process); REM (Removal or
disposal); PROC (Process)
(method for catalytic purifn. of combustion waste gases using
ethanol with complete reaction)
- L53 ANSWER 19 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
1997:32485 Document No. 126:119708 The preparation of advanced catalytic
materials by aerosol processes. Moser, William R.; Lennhoff, John D.;
Cnossen, Jack E.; Fraska, Karen; Schoonover, Justin W.; Rozak,
Jeffrey R.
(Department Chemical Engineering, Worcester Polytechnic Institute,
Worcester, MA, 01609, USA). Advanced Catalysts and Nanostructured
Materials, 535-562. Editor(s): Moser, William R. Academic: San
Diego,
Calif. (English) 1996. CODEN: 63URAA.
- AB A review, with 50 refs., of aerosol techniques for catalyst prepn.,
esp.

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for industrially important catalysts. Topics discussed include: (1) a historical background, (2) advanced catalyst synthesis by high-temp. aerosol decompn. (e.g., reactor configuration), (3) representative catalysts prep'd. by this method [e.g., metal-promoted La ferrate perovskites and Fe oxides for **Fischer-Tropsch** reaction; copper-modified zinc chromites for higher alc. synthesis; bismuth molybdates and modified bismuth molybdates for propylene oxidn. to acrolein; copper-zinc aluminate **methanol** synthesis catalysts; cobalt molybdate hydrodesulfurization catalysts; perovskite-type Sr-Ce-Yb oxide catalysts for methane oxidative coupling; alkali-metal modified Zn oxide catalysts; vanadium-phosphorus oxide catalysts for partial oxidn. (e.g., for manuf. of maleic anhydride); noble-metal petroleum dehydrogenation catalysts; alumina-supported silver catalysts for partial oxidn. (e.g., for manuf. of ethylene oxide); Pd on reactive supports for total oxidn. of waste hydrocarbons], and (4) the potential for processing of aerosols in manuf. of com. catalysts.

IT **67-56-1P, Methanol**, preparation
 RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)
 (aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)

RN 67-56-1 CAPLUS
 CN Methanol (8CI, 9CI) (CA INDEX NAME)

H₃C-OH

CC 51-0 (Fossil Fuels, Derivatives, and Related Products)
 Section cross-reference(s): 35, 60, 67

ST review aerosol catalyst manuf; **Fischer Tropsch** aerosol catalyst review; **methanol** synthesis aerosol catalyst review; partial oxidn aerosol catalyst review; oxidative coupling aerosol catalyst review; waste gas oxidn aerosol catalyst review

IT **Alcohols**, preparation
 RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)
 (C>1; aerosol-based techniques for manuf. of spinel-type **methanol**-synthesis catalysts)

IT Hydrogenation catalysts

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- (aerosol-based techniques for manuf. of **Fischer-Tropsch** and **methanol** synthesis catalysts)
- IT Chromium spinels
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(copper-modified zinc chromites; aerosol-based techniques for manuf. of spinel-type **methanol**-synthesis catalysts)
- IT Perovskite-type crystals
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(lanthanum ferrates $[La_x(Ca,Sr)_{1-x}FeO_3]$; aerosol-based techniques for manuf. of **Fischer-Tropsch** catalysts)
- IT Rare earth oxides
RL: **CAT (Catalyst use)**; USES (Uses)
(lanthanum ferrates, perovskites; aerosol-based techniques for manuf. of **Fischer-Tropsch** catalysts)
- IT 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; USES (Uses)
(aerosol-based techniques for manuf. of Pd on reactive supports for total oxidn. of hydrocarbons in waste gases)
- IT 13595-85-2P, Bismuth molybdate ($Bi_2Mo_3O_{12}$) 146956-92-5P, Bismuth iron molybdenum oxide ($(Bi,Fe)_2Mo_3O_{12}$)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(aerosol-based techniques for manuf. of bismuth molybdate-type partial oxidn. catalysts for manuf. of propane to acrolein)
- IT 56450-21-6P, Aluminum copper zinc oxide
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)
- IT 67-56-1P, **Methanol**, preparation
RL: FMU (Formation, unclassified); IMF (Industrial manufacture); FORM (Formation, nonpreparative); PREP (Preparation)
(aerosol-based techniques for manuf. of copper-zinc-aluminate-type catalysts for **methanol** synthesis)
- IT 7439-88-5P, Iridium, uses 7440-06-4P, Platinum, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(aerosol-based techniques for manuf. of noble metal-based petroleum

dehydrogenation catalysts)
IT 186257-34-1P, Lithium zinc oxide ($\text{LiO}-0.4\text{ZnO}-100.8-1$)
186257-35-2P,
Lithium magnesium zinc oxide ($\text{LiO}-0.4\text{MgO}-0.5\text{ZnO}-100.8-1$)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(aerosol-based techniques for manuf. of perovskite-type
alkali-metal
modified zinc oxide catalysts)
IT 186299-23-0P, Cobalt copper potassium zirconium oxide
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(aerosol-based techniques for manuf. of spinel-type **methanol**
-synthesis catalysts)
IT 12359-27-2P, Vanadyl phosphate (VOPO_4)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(aerosol-based techniques for manuf. of vanadium-phosphorus-type
oxidn.
catalysts)
IT 1317-60-8P, Hematite, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(aerosol; aerosol-based techniques for manuf. of **Fischer-**
Tropsch catalysts)
IT 7440-22-4P, Silver, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(alumina-supported; aerosol-based techniques for manuf. of
alumina-supported silver partial oxidn. catalysts)
IT 630-08-0, Carbon monoxide, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(hydrogenation of; aerosol-based techniques for manuf. of
Fischer-Tropsch and **methanol** synthesis
catalysts)
IT 11104-44-2P, Bismuth molybdate
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(partial oxidn. catalysts; aerosol-based techniques for manuf. of
bismuth molybdate-type partial oxidn. catalysts)
IT 109547-09-3P, Iron lanthanum strontium oxide ($\text{Fe}(\text{La},\text{Sr})\text{O}_3$)
110758-99-1P,
Calcium iron lanthanum oxide ($(\text{Ca},\text{La})\text{FeO}_3$)
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)

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- (perovskite; aerosol-based techniques for manuf. of **Fischer-Tropsch** catalysts)
- IT 125149-48-6P, Cerium strontium ytterbium oxide ((Ce,Yb)SrO_{2.5-3})
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(perovskite; aerosol-based techniques for manuf. of perovskite-type
Sr-Ce-Yb oxide catalysts for methane oxidative coupling)
- IT 7440-62-2P, Vanadium, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(phosphorus-contg. catalysts; aerosol-based techniques for manuf.
of
vanadium-phosphorus-type oxidn. catalysts)
- IT 113924-15-5P, Chromium copper zinc oxide (Cr₂(Cu,Zn)O₄)
186257-33-0P,
Cesium chromium copper zinc oxide (Cs₀₋₁Cr₁₋₂Cu_{0.05}Zn_{0.504})
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(spinel; aerosol-based techniques for manuf. of spinel-type
methanol-synthesis catalysts)
- IT 1344-28-1P, Aluminum oxide (Al₂O₃), uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(support; aerosol-based techniques for manuf. of alumina-supported
silver partial oxidn. catalysts)
- IT 7723-14-0P, Phosphorus, uses
RL: **CAT (Catalyst use)**; SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(vanadium-contg. catalysts; aerosol-based techniques for manuf. of
vanadium-phosphorus-type oxidn. catalysts)

L53 ANSWER 20 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN

1995:686849 Document No. 123:56833 Process for the production of
alcohols and diols by hydrogenation. Scarlett, John (Eastman
Chemical Company, USA). U.S. US 5395990 A 19950307, 14 pp.
(English).

CODEN: USXXAM. APPLICATION: US 1993-175542 19931230. PRIORITY: GB
1993-24753 19931202.

AB A process for the prodn. of a **alcs.** and diols by hydrogenation
of a hydrogenatable material selected from monoesters of carboxylic
acids,
monoesters of dicarboxylic acids, diesters of dicarboxylic acids,
aldehydes, olefinically unsatd. aldehydes, and mixts. of two or more
thereof, comprises (a) providing a hydrogenation zone contg. a charge
of a

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granular hydrogenation catalyst which has a total surface area of at least

about 15 m² /g, a **pore size** distribution such that more than 50% of the **pore vol.** is provided by **pores** in the **size** range less than about 40 nm, and a surface area distribution such that more than 50% of the total surface area is provided by **pores** in the **size** range of from about 7 nm to about 40 nm; (b) supplying to the hydrogenation zone a

feed

stream of a mixt. contg. hydrogen and the hydrogenatable material; (c) maintaining the hydrogenation zone under temp. and pressure conditions which are conducive to effecting hydrogenation of the hydrogenatable material; and (d) recovering a product stream comprising the hydroxy compd. The process is exemplified by the hydrogenation of di-Me 1,4-cyclohexanedicarboxylate to yield 1,4-cyclohexanedimethanol.

IT 1314-13-2D, Zinc oxide, reduced 7440-05-3, Palladium,
uses

RL: CAT (Catalyst use); USES (Uses)

(process for the prodn. of **alcs.** and diols by hydrogenation)

RN 1314-13-2 CAPLUS

CN Zinc oxide (ZnO) (9CI) (CA INDEX NAME)

O= Zn

RN 7440-05-3 CAPLUS

CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

IC ICM C07C029-147

ICS C07C029-14; C07C027-04

NCL 568864000

CC 35-2 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 45

ST **alc** diol prepn hydrogenation; cyclohexanedimethanol prepn
hydrogenation; ester hydrogenation; lactone hydrogenation; aldehyde
hydrogenation

IT Hydrogenation

Hydrogenation catalysts

(process for the prodn. of **alcs.** and diols by hydrogenation)

IT **Alcohols**, preparation

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- Glycols, preparation
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT Aldehydes, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT Lactones
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT Carboxylic acids, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (esters, process for the prodn. of **alcs.** and diols by hydrogenation)
- IT **1314-13-2D**, Zinc oxide, reduced **1344-70-3D**, Copper oxide, reduced **7440-05-3**, Palladium, uses **11104-65-7D**, Copper chromite, reduced
 RL: **CAT (Catalyst use)**; **USES (Uses)**
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT **105-08-8P**, 1,4-Cyclohexanedimethanol
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- IT **94-60-0**, Dimethyl 1,4-cyclohexanedicarboxylate **96-48-0**, γ -Butyrolactone **110-62-3**, n-Valeraldehyde **123-72-8**, n-Butyraldehyde **141-05-9**, Diethyl maleate **502-44-3**, ϵ -Caprolactone **624-48-6**, Dimethyl maleate **645-62-5**, 2-Ethyl-hexen-2-al **34880-43-8**, 2-Propylhept-2-enal **37942-76-0**
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (process for the prodn. of **alcs.** and diols by hydrogenation)
- L53 ANSWER 21 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN
 1993:237298 Document No. 118:237298 Catalytic **reforming** of toluene with carbon dioxide over rare earth oxide promoted palladium/ γ -alumina catalysts. Pillai, S. Muthukumar; Ohnishi, R.; Ichikawa, M. (Res. Cent., Indian Petrochem. Corp. Ltd., Baroda, 391 346, India). Reaction Kinetics and Catalysis Letters, 48(1), 247-54 (English) 1992. CODEN: RKCLAU. ISSN: 0304-4122.
- AB On **Pd/ γ -Al₂O₃** catalysts, PhMe undergoes **reforming** with CO₂ to give benzene and synthesis gas at 1 atm and 400-500°. Among the **promoters**, **Ce** oxide showed improved selectivity and activity, compared with other rare earth oxides.
 Based on the catalytic runs and temp.-programmed reaction expts., the mechanism of the reaction was proposed.
- CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
 Section cross-reference(s): 47

ST toluene oxidn benzene synthesis gas; partial oxidn toluene synthesis gas;

palladium toluene partial oxidn benzene; rare earth oxide toluene oxidn;

cerium oxide toluene partial oxidn; **reforming** toluene carbon dioxide palladium

IT Rare earth oxides

RL: **CAT (Catalyst use)**; USES (Uses)

(catalysts, contg. palladium, for **reforming** of toluene with carbon dioxide, to benzene and synthesis gas)

IT Fuel gas manufacturing

(synthesis gas, **reforming**, of toluene, with carbon dioxide, rare earth oxide-promoted palladium catalysts for)

IT 7440-19-9, Samarium, uses

RL: **CAT (Catalyst use)**; USES (Uses)

(catalysts, contg. palladium, for partial oxidn.-**reforming** of toluene with carbon dioxide, for manuf. of synthesis gas)

IT 7439-89-6, Iron, uses 7439-91-0, Lanthanum, uses 7440-45-1, Cerium,

uses 7440-48-4, Cobalt, uses 7440-62-2, Vanadium, uses

7440-65-5,

Yttrium, uses

RL: **CAT (Catalyst use)**; USES (Uses)

(catalysts, contg. palladium, for **reforming** of toluene with carbon dioxide, for manuf. of synthesis gas)

IT 7440-05-3, Palladium, uses

RL: **CAT (Catalyst use)**; USES (Uses)

(catalysts, rare earth oxide-promoted, for **reforming** of toluene with carbon dioxide)

IT 71-43-2P, Benzene, preparation

RL: FORM (Formation, nonpreparative); PREP (Preparation)

(formation of, in **reforming** of toluene with carbon dioxide, palladium-based catalysts for)

IT 108-88-3, Toluene, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(**reforming** of, with carbon dioxide, for manuf. of synthesis gas, palladium catalysts for)

IT 124-38-9, Carbon dioxide, uses

RL: USES (Uses)

(toluene **reforming** with, for manuf. of synthesis gas, palladium catalysts for)

L53 ANSWER 22 OF 22 CAPLUS COPYRIGHT 2004 ACS on STN

1980:180613 Document No. 92:180613 Hydrogenation of crotonaldehyde in an aqueous solution of lithium hydroxide on mixed 1% **palladium-**

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ruthenium/alumina catalysts. Tolstykh, E. V.; Kozina, S. M.; Sokol'skii, D. V. (USSR). Khimiya i Khimicheskaya Tekhnologiya (Alma-Ata, 1962-) 166-73 (Russian) 1978. CODEN: SSAKAG. ISSN: 0371-2842.

AB The title reaction initially gave PrCHO in 0.5-1 N LiOH and MeCH:CHCH₂OH in 0.05-0.1 N LiOH. The final BuOH yield passed through a max. of 77.5% yield in 0.1 N LiOH over 1% 1:3 Pd-Ru/Al₂O₃.

IT 71-36-3P, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, by hydrogenation of crotonaldehyde, mechanism of catalytic)

RN 71-36-3 CAPLUS
CN 1-Butanol (9CI) (CA INDEX NAME)

H₃C-CH₂-CH₂-CH₂-OH

CC 23-7 (Aliphatic Compounds)

IT 7440-18-8, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalyst, with palladium, for hydrogenation of crotonaldehyde, effect of lithium hydroxide concn. of, on mechanism with)

IT 7440-05-3, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalyst, with ruthenium, for hydrogenation of crotonaldehyde, effect of lithium hydroxide concn. on mechanism with)

IT 71-36-3P, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(prepn. of, by hydrogenation of crotonaldehyde, mechanism of catalytic)

=> d 154 1-88 ti

L54 ANSWER 1 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Low-temperature combustion of CH₄ over CeO₂-MOx solid solution (M = Zr⁴⁺, La³⁺, Ca²⁺, or Mg²⁺) promoted Pd/γ-Al₂O₃ catalysts

L54 ANSWER 2 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Behavior of Fresh and Deactivated Combustion Promoter Additives

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- L54 ANSWER 3 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Method for preparation of ruthenium-alumina catalyst used in ammonia synthesis
- L54 ANSWER 4 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of promoters on the catalytic properties and surface characteristics of Ru-B/ZrO₂ amorphous alloy catalysts
- L54 ANSWER 5 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of cerium oxide on the oxidation activity and thermal stability of Pd/Al₂O₃ catalysts
- L54 ANSWER 6 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Influence of the nature of the Ce-promoter on the behavior of Pd and Pd-Cr TWC systems
- L54 ANSWER 7 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalytic ceramic membrane in a three-phase reactor for the competitive hydrogenation-isomerization of methylenecyclohexane
- L54 ANSWER 8 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of Ni on the activity of Pd-La-Ce automotive exhaust catalysts
- L54 ANSWER 9 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI The thermal stability and catalytic performance of Ce-Zr promoted Rh-Pd/ γ -Al₂O₃ automotive catalysts
- L54 ANSWER 10 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalytic performance of Pd/Al₂O₃ catalyst prepared by glow discharge plasma method for selective hydrogenation of acetylene
- L54 ANSWER 11 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Metal-promoter interface in Pd/(Ce,Zr)O_x/Al₂O₃ catalysts: effect of thermal aging
- L54 ANSWER 12 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Method and apparatus for exhaust gas treatment
- L54 ANSWER 13 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Activity and stability of RuO₂/ γ -Al₂O₃ catalyst in wet air oxidation

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- L54 ANSWER 14 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalysts for cleaning of diesel engine exhaust gases
- L54 ANSWER 15 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Oxidative decomposition of naphthalene by supported metal catalysts
- L54 ANSWER 16 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Promoted nickel-magnesium oxide catalysts and process for producing synthesis gas
- L54 ANSWER 17 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Promoted nickel-magnesium oxide catalysts for producing synthesis gas by
autothermal partial oxidation
- L54 ANSWER 18 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Discovery of new paraffin isomerization catalysts based on $\text{SO}_4^{2-}/\text{ZrO}_2$
and WO_x/ZrO_2 applying combinatorial techniques
- L54 ANSWER 19 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Ceria and automotive catalyst
- L54 ANSWER 20 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Combustion-deposited metal-metal oxide catalysts for
short-contact-time
partial oxidation of methane to synthesis gas
- L54 ANSWER 21 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Activity of $\text{Pd}/\text{Al}_2\text{O}_3$ and $\text{Ru}/\text{Al}_2\text{O}_3$ catalysts in the hydrogenation of
o-xylene. Effect of thiophene
- L54 ANSWER 22 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Preparation of $\text{Pd-Ce}/\text{ZrO}_2$ catalysts for methane oxidation
- L54 ANSWER 23 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Ceramic fiber filter having catalysts and promoters supported on coat
layer
- L54 ANSWER 24 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Ceramic body and ceramic catalyst body
- L54 ANSWER 25 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Influence of thermal sintering on the activity for CO-O_2 and $\text{CO-O}_2\text{-NO}$

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stoichiometric reactions over Pd/(Ce,Zr)Ox/Al₂O₃ catalysts

L54 ANSWER 26 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Photocatalytic interior wall sheets with good humidity controlling properties

L54 ANSWER 27 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Total oxidation of methane over palladium catalyst supported on modified alumina

L54 ANSWER 28 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Supported Pd catalysts for high-temperature methane combustion - examining the combustion synthesis preparation method

L54 ANSWER 29 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Catalyst-supported filter for purification of exhaust gas

L54 ANSWER 30 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Effects of Copper on the Catalytic Properties of Bimetallic Pd-Cu/(Ce,Zr)Ox/Al₂O₃ and Pd-Cu/(Ce,Zr)Ox Catalysts for CO and NO Elimination

L54 ANSWER 31 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Interior walls with photocatalytic materials also showing humidity-controlling properties and their manufacture

L54 ANSWER 32 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Pd-, Pt-, and Rh-Loaded Ce_{0.6}Zr_{0.35}Y_{0.05}O₂ Three-Way Catalysts: An Investigation on Performance and Redox Properties

L54 ANSWER 33 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Preparation of Ru Nanoparticles Supported on γ -Al₂O₃ and Its Novel Catalytic Activity for Ammonia Synthesis

L54 ANSWER 34 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Effect of Thermal Sintering on Light-Off Performance of Pd/(Ce,Zr)Ox/Al₂O₃ Three-Way Catalysts: Model Gas and Engine Tests

L54 ANSWER 35 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

TI Study of CeO₂-ZrO₂ solid solution promoters modified by Nd

L54 ANSWER 36 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

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- TI Preparation method study on Pd/Ce/Al/monolith honeycomb catalyst
- L54 ANSWER 37 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Membrane-catalyst systems for selectivity improvement in dehydrogenation and hydrogenation reactions
- L54 ANSWER 38 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Conversion of ethane to ethylene and synthesis gas with cerium oxide. Promoting effect of Pt, Rh and Ru
- L54 ANSWER 39 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI New Pd/CexZrl-xO2/Al2O3 three-way catalysts prepared by microemulsion. Part 2. In situ analysis of CO oxidation and NO reduction under stoichiometric CO + NO + O2
- L54 ANSWER 40 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI New Pd/CexZrl-xO2/Al2O3 three-way catalysts prepared by microemulsion. Part 1. Characterization and catalytic behavior for CO oxidation
- L54 ANSWER 41 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Effect of rare earth promoter on complete oxidation activity of Pd/Al2O3 catalyst for methane
- L54 ANSWER 42 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI A new approach of CeO2 and La2O3 effects on the three-way catalysts containing low precious metals
- L54 ANSWER 43 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Structure of Pd/CeOx/Al2O3 Catalysts for NOx Reduction Determined By in Situ X-ray Absorption Spectroscopy
- L54 ANSWER 44 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Correlation between basicity and the adsorption of NO on supported Pd catalysts
- L54 ANSWER 45 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Characterization of model automotive exhaust catalysts: Pd on Zr-rich ceria-zirconia supports
- L54 ANSWER 46 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
- TI Neural network modeling of transition metal-zeolite exhaust catalysts

- L54 ANSWER 47 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Thermal aging of Pd/Pt/Rh automotive catalysts under a cycled oxidizing-reducing environment
- L54 ANSWER 48 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Modifying catalytic properties of palladium by addition of rare earths (Ce, La): activity and catalytic selectivity in hydrocarbon conversion reactions
- L54 ANSWER 49 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effect of CuO on performance of precious metal/CeO₂/Al₂O₃ monolith catalyst
- L54 ANSWER 50 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Sealed solid electrolyte permselective gas sensors
- L54 ANSWER 51 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Influence of Ceria on Pd Activity for the CO+O₂ Reaction
- L54 ANSWER 52 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI New method of liquid phase hydrogenation by metallic catalysts
- L54 ANSWER 53 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Characteristics of Pd catalysts for methane oxidation
- L54 ANSWER 54 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalyst for treating exhaust gases from internal combustion engines
- L54 ANSWER 55 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Modification by lanthanide (La, Ce) promotion of catalytic properties of palladium: Characterization of the catalysts
- L54 ANSWER 56 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalytic decomposition of CFCs
- L54 ANSWER 57 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI CO oxidation on Pd/CeO₂-ZrO₂ catalysts
- L54 ANSWER 58 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI The role of zirconium in novel three-way catalysts
- L54 ANSWER 59 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Kinetics of wet oxidation of black liquor over a Pt-Pd-Ce/alumina catalyst

- L54 ANSWER 60 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Alumina-Supported Noble Metal Catalysts for Destructive Oxidation of Organic Pollutants in Effluent from a Softwood Kraft Pulp Mill
- L54 ANSWER 61 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Light-off performance over cobalt oxide- and ceria-promoted platinum and palladium catalysts
- L54 ANSWER 62 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Low temperature catalytic activity of cobalt oxide and ceria promoted Pt and Pd: -influence of pretreatment and gas composition
- L54 ANSWER 63 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Terbium and **cerium promotion** of NO decomposition and NO-CO reaction on Pd and Rh catalysts
- L54 ANSWER 64 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Exhaust gas purification catalysts consisting of stainless steel honeycomb carriers with improved mechanical strength and manufacture of the catalysts
- L54 ANSWER 65 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI The effect of promoters on Pt/Al₂O₃ catalysts for the reduction of NO by C₃H₆ under lean-burn conditions
- L54 ANSWER 66 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Predoped iron oxide dehydrogenation catalysts for styrene manufacture
- L54 ANSWER 67 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Exhaust gas treatment catalyst complex containing mixed cerium and zirconium oxide promoter
- L54 ANSWER 68 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Reduction of mixed alumina-supported Pt-Ru-Ce catalysts with hydrogen
- L54 ANSWER 69 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Regeneration of dehydrogenation and dehydrocyclization catalysts by decoking with chlorine and molecular oxygen
- L54 ANSWER 70 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

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- TI Palladium alloy catalyst for thermal decomposition of NO
- L54 ANSWER 71 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalysts for combustion of hydrocarbon oils
- L54 ANSWER 72 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Magnesium oxide-lanthanum oxide-alumina non-spinel ternary metal oxides
for metals passivation and sulfur oxide control in petroleum catalytic cracking
- L54 ANSWER 73 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effect of cerium on performance and physicochemical properties of platinum-containing automotive emission control catalysts
- L54 ANSWER 74 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Preparation and characterization of chlorine-free ruthenium catalysts and
the promoter effect in ammonia synthesis. 3. A magnesia-supported ruthenium catalyst
- L54 ANSWER 75 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Preparation and characterization of chlorine-free ruthenium catalysts and
the promoter effect in ammonia synthesis. 2. A lanthanide oxide-promoted ruthenium/alumina catalyst
- L54 ANSWER 76 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Methane oxidation over alumina-supported noble metal catalysts with
and without cerium additives
- L54 ANSWER 77 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Lanthanide nitrates as effective promoters of a ruthenium-alumina catalyst
for ammonia synthesis
- L54 ANSWER 78 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI New concept of promoter action in supported ruthenium catalyst for ammonia
synthesis
- L54 ANSWER 79 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Characterization of palladium/ γ -alumina catalysts containing ceria

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- L54 ANSWER 80 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Structural analysis of zinc oxide/zinc chromium oxide
(ZnCr2O4)/palladium
catalyst
- L54 ANSWER 81 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Oxidation state of cerium in cerium-based catalysts investigated by
spectroscopic probes
- L54 ANSWER 82 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Effects of platinum, palladium, and ruthenium on the reducibility of
cerium (4+) ions in cerium-alumina catalysts and the reactivity of
oxygen
radicals
- L54 ANSWER 83 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI High-temperature catalyst compositions for internal combustion engines
- L54 ANSWER 84 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Oxidation catalyst for turbine exhaust gas purging at high
temperature and
space velocity
- L54 ANSWER 85 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Interaction of cerium oxide with noble metals
- L54 ANSWER 86 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Mixed **palladium-ruthenium** and palladium-rhodium
catalyst on an **alumina** support for the hydrogenation of phenol
- L54 ANSWER 87 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalytic compositions
- L54 ANSWER 88 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
TI Catalyst composition of copper oxide-iron oxide on alumina

=> d 154 4,5,6,11,16,58,79,87 cbib abs hitstr hitind

- L54 ANSWER 4 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2004:273407 Document No. 140:259715 Effects of promoters on the
catalytic
properties and surface characteristics of Ru-B/ZrO2 amorphous alloy

Henderson

catalysts. Han, Min-le; Liu, Shou-chang; Yang, Xiao-di; Wang, Ke; Qiao, Yu-qin; Zhang, Shu-fang (Department of Chemistry, Zhengzhou University, Zhengzhou, 450052, Peop. Rep. China). Fenzi Cuihua, 18(1), 47-50 (Chinese) 2004. CODEN: FECUEN. ISSN: 1001-3555. Publisher: Kexue Chubanshe.

AB On the basis of the measurement of activity and selectivity, the effects

of Fe, Zn, La and Ce promoters on the catalytic properties and surface character of Ru-B/ZrO₂ amorphous alloy catalysts have been studied by means of BET surface measurement, DSC and TPR etc. The results show that the promoters can increase the activity and selectivity evidently, enhance thermal stability of the amorphous alloy catalysts, influence on surface properties and redn. behavior of the catalysts. It was found that there

are metal state and Ru-B-O species for Ru as an active component under the catalytic reaction conditions, which are relative to the activity and selectivity resp.

IT 7440-45-1, Cerium, uses

RL: CAT (Catalyst use); PRP (Properties); USES (Uses)
(effects of promoters on catalytic properties and surface characteristics of Ru-B/ZrO₂ amorphous alloy catalysts)

RN 7440-45-1 CAPLUS

CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
Section cross-reference(s): 56, 66

IT Metallic glasses

Metals, uses

RL: CAT (Catalyst use); PRP (Properties); USES (Uses)
(effects of promoters on catalytic properties and surface characteristics of Ru-B/ZrO₂ amorphous alloy catalysts)

IT 1314-23-4, Zirconia, uses 7439-89-6, Iron, uses 7439-91-0, Lanthanum, uses 7440-45-1, Cerium, uses 7440-66-6, Zinc, uses 454251-87-7

RL: CAT (Catalyst use); PRP (Properties); USES (Uses)

Henderson

(effects of **promoters** on catalytic properties and surface characteristics of **Ru-B/ZrO₂** amorphous alloy catalysts)

- L54 ANSWER 5 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2004:195055 Document No. 140:274976 Effects of cerium oxide on the oxidation activity and thermal stability of Pd/Al₂O₃ catalysts. He, Chong-Heng; Zhu, Ming; Jin, Guo-Lin; Xu, Pei-Ruo; Wang, Ren (Coll. Chem. Eng., East China Univ. Sci. & Technol., Shanghai, 200237, Peop. Rep. China). Yingyong Huaxue, 21(2), 154-158 (Chinese) 2004. CODEN: YIHUED. ISSN: 1000-0518. Publisher: Kexue Chubanshe.
- AB The effects of **cerium** oxide on the catalytic activity and thermal stability of **Pd/Al₂O₃** were investigated. **Cerium** oxide improved the performance of **Pd/Al₂O₃** catalysts in removal of CO and C₃H₆ from simulated exhaust gas. **Cerium** oxide could widen the operation-window of oxidn. reaction under redn. conditions ($\lambda > 1$) due to its high oxygen storage-release capacity. Moreover, a great advantage of **cerium** oxide as a **promoter** is that it stabilizes the dispersion of **Pd** particles on the surface of **Al₂O₃** during the sintering process. It may be due to the interaction of **Pd** with **cerium** oxide to form a **Pd $\cdot\delta$ +** species which are more stable than PdO at high temp.
- CC 59-3 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 51, 67
- IT 1306-38-3, Cerium oxide, uses 1344-28-1, Alumina, uses 7440-05-3, Palladium, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(effects of cerium oxide on oxidn. activity and thermal stability of Pd/Al₂O₃ catalysts)

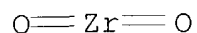
- L54 ANSWER 6 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2004:149523 Document No. 140:394580 Influence of the nature of the Ce-promoter on the behavior of Pd and Pd-Cr TWC systems. Iglesias-Juez, A.; Martinez-Arias, A.; Hungria, A. B.; Anderson, J. A.; Conesa, J. C.; Soria, J.; Fernandez-Garcia, M. (CSIC, Instituto de Catalisis y Petroleoquimica, Madrid, 28049, Spain). Applied Catalysis, A: General, 259(2), 207-220 (English) 2004. CODEN: ACAGE4. ISSN: 0926-860X. Publisher: Elsevier Science B.V..

- AB A series of monometallic **Pd** and bimetallic **Pd-Cr** catalysts supported on **CeOx/Al2O3** (CA) and **(Ce, Zr)Ox/Al2O3** (CZA) materials have been characterized using a combination of x-ray diffraction (XRD), electron microscopy, and Raman spectroscopy, and ESR and in situ diffuse reflectance Fourier transform IR and x-ray near-edge structure spectroscopies were used to analyze the redox and chem. processes taking place under light-off conditions in a gaseous, stoichiometric mixt. contg. CO, NO, and O2. The catalytic behavior of these mono- and bimetallic systems was strongly affected by the nature of the **cerium-contg. promoter**. The **Pd-ceria** interface appeared significantly more active than **Pd-ceria/zirconia** in both CO oxidn. and NO redn. processes under stoichiometric conditions. This factor seems to dominate the differential behavior of **Pd** monometallic systems. In the case of **Pd-Cr** bimetallic systems, an addnl. strong influence of the base metal on the oxidn. state of **Pd** appears of importance in explaining the catalytic behavior of the samples. For the **CeOx/Al2O3**-supported catalyst, the formation of **Pd(0)** at lower temps. leads to an initial enhancement in activity, while formation of a **Pd-Cr** alloy above 473 K suppressed full NO conversion at high temps. These effects were absent in the **(Ce, Zr)Ox/Al2O3**-supported system.
- IT 1344-28-1, Aluminum oxide (**Al2O3**), uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; influence of the nature of the **Ce promoter** on the behavior of **Pd** and **Pd-Cr** three-way exhaust gas catalyst systems)
- RN 1344-28-1 CAPLUS
- CN Aluminum oxide (**Al2O3**) (8CI, 9CI) (CA INDEX NAME)
- *** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
- CC 59-3 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 51, 67
- IT 1344-28-1, Aluminum oxide (**Al2O3**), uses
RL: **CAT (Catalyst use)**; USES (Uses)
(catalyst support; influence of the nature of the **Ce promoter** on the behavior of **Pd** and **Pd-Cr** three-way exhaust gas catalyst systems)
- IT 7440-05-3, Palladium, uses 7440-47-3, Chromium, uses 53169-24-7, Cerium zirconium oxide (**Ce0.5Zr0.5O2**)
RL: **CAT (Catalyst use)**; USES (Uses)

(influence of the nature of the Ce promoter on the behavior of Pd and Pd-Cr three-way exhaust gas catalyst systems)

- L54 ANSWER 11 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2003:926567 Document No. 140:222067 Metal-**promoter** interface in Pd/(Ce,Zr)Ox/Al₂O₃ catalysts: effect of thermal aging. Iglesias-Juez, A.; Martinez-Arias, A.; Fernandez-Garcia, M. (CSIC, Instituto de Catalisis y Petroleoquimica, Madrid, 28049, Spain).
Journal of Catalysis, 221(1), 148-161 (English) 2004. CODEN: JCTLA5. ISSN: 0021-9517. Publisher: Elsevier Science.
- AB The behavior of Pd three-way catalysts (TWCs) **promoted** with Ce-Zr mixed oxides and supported on alumina, which were subjected to thermal degrdn. treatments, has been examd. during light-off tests under stoichiometric CO + NO + O₂. Attention was paid to the region of aging temp. 1273-1373 K, where phase segregation of the ceria-zirconia **promoter** occurs. Characterization of the samples was performed using x-ray diffraction and Raman spectroscopy.
In situ XANES/DRIFTS studies of the Pd chem. state at the surface and in the bulk of the materials were conducted to det. the noble metal response to the gas atm. during light-off. ESR was used to analyze the **promoter** surface and to study the redox response of the materials in contact with the reactant gases. Thermal degrdn. appears to sinter both the noble metal and **promoter** components of the catalyst but also stabilizes oxidized Pd entities in contact with the **promoter** prior to the occurrence of the Ce-Zr phase segregation reaction. Addnl., it enriches the **promoter** surface in the lanthanide cation. The influence of these physicochem. phenomena on the catalytic properties of the Pd-based TWCs is discussed.
- IT 1314-23-4, Zirconium oxide (ZrO₂), formation (nonpreparative)
RL: CAT (Catalyst use); FMU (Formation, unclassified); FORM (Formation, nonpreparative); USES (Uses)
(mixed-oxide **promoter** formation from; thermal aging effect on metal-**promoter** interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)

RN 1314-23-4 CAPLUS
 CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



IT 1344-28-1, Alumina, uses 7440-05-3,
 Palladium, uses
 RL: CAT (Catalyst use); USES (Uses)
 (thermal aging effect on metal-promoter interface in
 Pd/(Ce,Zr)Ox/Al2O3 three-way exhaust gas
 catalysts)

RN 1344-28-1 CAPLUS
 CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
 RN 7440-05-3 CAPLUS
 CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

CC 59-3 (Air Pollution and Industrial Hygiene)
 Section cross-reference(s): 51, 67
 ST metal promoter interface palladium cerium
 zirconium oxide alumina catalyst; three way exhaust catalyst
 palladium cerium zirconium oxide alumina
 IT IR spectra
 (Fourier-transform, diffuse reflectance, of catalysts; thermal
 aging effect on metal-promoter interface in Pd/(
 Ce,Zr)Ox/Al2O3 three-way exhaust gas catalysts)
 IT Oxidation catalysts
 Reduction catalysts
 (exhaust gas; thermal aging effect on metal-promoter
 interface in Pd/(Ce,Zr)Ox/Al2O3 three-way
 exhaust gas catalysts)
 IT ESR (electron spin resonance)
 Raman spectra
 Thermal aging
 X-ray diffraction
 XANES spectra
 (of catalysts; thermal aging effect on metal-promoter

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- interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)
- IT Catalysts
(three-way exhaust gas; thermal aging effect on metal-promoter interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)
- IT Catalysts
(three-way, exhaust gas; thermal aging effect on metal-promoter interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)
- IT Exhaust gas catalytic converters
(three-way; thermal aging effect on metal-promoter interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)
- IT 1306-38-3, Cerium oxide (CeO₂), formation (nonpreparative)
1314-23-4, Zirconium oxide (ZrO₂), formation (nonpreparative)
RL: CAT (Catalyst use); FMU (Formation, unclassified); FORM (Formation, nonpreparative); USES (Uses)
(mixed-oxide promoter formation from; thermal aging effect on metal-promoter interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)
- IT 65453-23-8, Cerium zirconium oxide
RL: CAT (Catalyst use); USES (Uses)
(promoter; thermal aging effect on metal-promoter interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)
- IT 630-08-0, Carbon monoxide, reactions 11104-93-1, Nitrogen oxide (NO_x),
reactions
RL: RCT (Reactant); REM (Removal or disposal); PROC (Process); RACT (Reactant or reagent)
(removal of; thermal aging effect on metal-promoter interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)
- IT 1344-28-1, Alumina, uses 7440-05-3, Palladium, uses
RL: CAT (Catalyst use); USES (Uses)
(thermal aging effect on metal-promoter interface in Pd/(Ce,Zr)Ox/Al₂O₃ three-way exhaust gas catalysts)

L54 ANSWER 16 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
2003:696827 Document No. 139:216770 Promoted nickel-magnesium oxide catalysts and process for producing synthesis gas. Ramani, Sriram;

Henderson

Allison, Joe D.; Minahan, David M.; Wright, Harold A. (Conoco Inc., USA).
PCT Int. Appl. WO 2003072492 A1 20030904, 37 pp. DESIGNATED STATES:
W:
AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO,
CR,
CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,
ID,
IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
MD,
MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,
SK,
SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, AM,
AZ,
BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM,
CY,
DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT,
SE,
SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO
2003-US627

20030109. PRIORITY: US 2002-PV359258 20020222.

AB Synthesis gas (CO/H) is produced by passing a mixt. of light hydrocarbons

contg. 50 vol.% of methane and oxygen over a catalyst while maintaining

autothermal catalytic partial oxidn. **promoting** conditions. The catalyst consists of a nickel-magnesium oxide solid soln. and at least one

promoter, such as Cr, Mn, Mo, W, Sn, Re, Rh, **Ru**, Ir, Pt, La, **Ce**, Sm, Yb, Lu, Bi, Sb, In, P, or their oxides carried on a refractory support. The support can be **zirconia**, magnesia stabilized **zirconia**, **zirconia** stabilized

alumina, yttrium stabilized **zirconia**, calcium stabilized

zirconia, **alumina**, cordierite, mullite, titania, silica,

magnesia, niobia, vanadia, nitrides, or carbides. The catalyst is prepd.

by impregnating a support with a MgO precursor which is decompd. by thermal treatment to obtain a MgO impregnated support, followed by impregnation of the product with a nickel or nickel oxide precursor

which

is thermally treated to obtain a Ni and/or nickel oxide, MgO contg. intermediate, followed by impregnation with a **promotor**

precursor, thermal treatment, and optional redn. of the catalyst. The partial oxidn. process is carried out at 200-10,000 kPa and 600-1,600

whereby the gas is passed over the catalyst at a gas hourly space velocity

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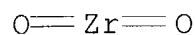
of 100,000,000/h with a catalyst residence time of 10 ms. A combustibile gas is added to the reaction mixt. sufficient to initiate a net catalytic partial oxidn. reaction. The reaction mixt. is preheated to 30-750.

IT 1314-23-4, Zirconia, uses 1314-23-4D, Zirconia, magnesia, Y, Ca-stabilized 1344-28-1, Alumina, uses 1344-28-1D, Alumina, zirconia-stabilized

RL: CAT (Catalyst use); USES (Uses)
(catalyst support; promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)

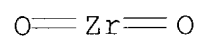
RN 1314-23-4 CAPLUS

CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



RN 1314-23-4 CAPLUS

CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

RN 1344-28-1 CAPLUS

CN Aluminum oxide (Al2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT 7440-18-8, Ruthenium, uses 7440-45-1, Cerium, uses

RL: CAT (Catalyst use); USES (Uses)
(promoter; promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)

RN 7440-18-8 CAPLUS

CN Ruthenium (8CI, 9CI) (CA INDEX NAME)

Ru

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RN 7440-45-1 CAPLUS
CN Cerium (8CI, 9CI) (CA INDEX NAME)

Ce

IC ICM C01B003-26
ICS B01J023-755

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67

IT Carbides
Nitrides

RL: CAT (Catalyst use); USES (Uses)

(catalyst support; promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)

IT 1302-88-1, Cordierite 1302-93-8, Mullite 1313-96-8, Niobia
1314-23-4, Zirconia, uses 1314-23-4D, Zirconia,
magnesia, Y, Ca-stabilized 1314-62-1, Vanadia, uses 1344-28-1,
Alumina, uses 1344-28-1D, Alumina, zirconia-stabilized
7631-86-9, Silica, uses 13463-67-7, Titania, uses

RL: CAT (Catalyst use); USES (Uses)

(catalyst support; promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)

IT 7440-65-5D, Yttrium, zirconia stabilized with 7440-70-2D, Calcium,
zirconia stabilized with

RL: CAT (Catalyst use); MOA (Modifier or additive use); USES
(Uses)

(catalyst support; promoted nickel-magnesium oxide catalysts for producing synthesis gas by autothermal partial oxidn.)

IT 1309-48-4, Magnesium oxide (MgO), uses 1313-99-1, Nickel oxide, uses
7440-02-0, Nickel, uses

RL: CAT (Catalyst use); USES (Uses)

(promoted nickel-magnesium oxide catalysts for producing synthesis

gas

by autothermal partial oxidn.)

IT 74-82-8, Methane, reactions 142-72-3, Magnesium acetate 373-02-4,
Nickel acetate 7782-44-7, Oxygen, reactions 10099-59-9, Lanthanum
nitrate 10103-47-6, Chromium nitrate 10377-60-3, Magnesium nitrate
10377-66-9, Manganese nitrate 13138-45-9, Nickel nitrate

17309-53-4,

Cerium nitrate 20634-12-2, Platinum(2+), tetraammine-, dinitrate

RL: RCT (Reactant); RACT (Reactant or reagent)

(promoted nickel-magnesium oxide catalysts for producing

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synthesis gas by autothermal partial oxidn.)
 IT 7439-88-5, Iridium, uses 7439-91-0, Lanthanum, uses 7439-94-3,
 Lutetium, uses 7439-96-5, Manganese, uses 7439-98-7, Molybdenum,
 uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6,
 Rhodium,
 uses 7440-18-8, Ruthenium, uses 7440-19-9, Samarium, uses
 7440-31-5, Tin, uses 7440-33-7, Tungsten, uses 7440-36-0,
 Antimony,
 uses 7440-45-1, Cerium, uses 7440-47-3, Chromium,
 uses 7440-64-4, Ytterbium, uses 7440-69-9, Bismuth, uses
 7440-74-6,
 Indium, uses 7723-14-0, Phosphorus, uses
 RL: CAT (Catalyst use); USES (Uses)
 (promoter; promoted nickel-magnesium oxide
 catalysts for producing synthesis gas by autothermal partial
 oxidn.)

L54 ANSWER 58 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

1998:539531 Document No. 129:206394 The role of zirconium in novel
 three-way

catalysts. Mussmann, L.; Lindner, D.; Lox, E. S.; Van Yperen, R.;
 Kreuzer, T. P.; Mitsushima, I.; Taniguchi, S.; Garr, G. (Degussa AG,
 Germany). Society of Automotive Engineers, [Special Publication] SP,
 SP-1288(Zirconium in Emission Control), 57-68 (English) 1997. CODEN:
 SAESA2. ISSN: 0099-5908. Publisher: Society of Automotive Engineers.

AB Zirconium dioxide (**zirconia**) is a well-known material often
 being a major component in the washcoat systems of three-way catalysts
 (TWC) and diesel oxidn. catalysts. One important characteristic of
zirconia contg. washcoats is an improved aging stability which is
 required to meet the more and more stringent emission stds. In the

last few years the utilization of **zirconia** became even more important
 - esp. for high sophisticated three-way washcoat systems. This was
 due to

the development of high temp. stable oxygen storage components, contg.
cerium dioxide (ceria) in combination with different other oxides
 - one very promising candidate being **zirconia**. In the present
 work the results of a research program are discussed, focusing on the
 influence of **zirconia** in combination with ceria and addnl. rare
 earth **promoters** on the stability of the oxygen storage
 characteristics. The performance of these materials was tested in
 powder

expts. as well as in completely formulated **Pd**-contg. TWC.

Special emphasis is put on a new developed dynamic oxygen storage
 model

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gas test, on activity tests in a model gas and on real engine evaluation

for the most promising systems. In summary the best catalyst performance

could be achieved with **zirconia** rich and ceria poor oxygen storage components in combination with small amts. of extra stabilizers.

These new developed **zirconia** rich materials enhance significantly the stability of the oxygen storage component per mass unit

ceria. By this, the amt. of expensive ceria in the washcoat could be decreased dramatically upon maintaining improved activity of **Pd**-based catalysts, even after high temp. engine aging.

CC 59-3 (Air Pollution and Industrial Hygiene)

Section cross-reference(s): 67

IT 1306-38-3, Ceria, uses 1314-23-4, Zirconia, uses 7440-05-3, Palladium, uses

RL: **CAT (Catalyst use)**; USES (Uses)

(role of zirconium in novel three-way catalysts)

L54 ANSWER 79 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN

1988:616809 Document No. 109:216809 Characterization of palladium/ γ -alumina catalysts containing ceria. Shyu, J. Z.; Otto, K.; Watkins, W. L.

H.; Graham, G. W.; Belitz, R. K.; Gandhi, H. S. (Res. Staff, Ford Mot. Co., Dearborn, MI, 48121, USA). Journal of Catalysis, 114(1), 23-33 (English) 1988. CODEN: JCTLA5. ISSN: 0021-9517.

AB The effects of adding CeO₂ to Pd/Al₂O₃ as a catalyst modifier were investigated by XPS and x-ray diffraction. Catalytic effects were demonstrated by using propane oxidn. as a model reaction. CeO₂ promotes

oxidn. of Pd to PdO both with and without Al₂O₃. High-temp. redn. (.simeq.920°) and the presence of Pd are required for the total conversion to bulk CeAlO₃ from CeO₂/Al₂O₃. Pd also assists in the oxidn.

of bulk CeAlO₃ to CeO₂ at elevated temps. In ambient air, Pd facilitates

surface oxidn. of CeAlO₃ to CeO₂, whereas surface Pd acquires an oxidn.

state between Pd and PdO. On Pd/Al₂O₃ the propane oxidn. rate is lowered

by CeO₂ if the O concn. exceeds that of the stoichiometric ratio.

CC 67-1 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

Section cross-reference(s): 59

Henderson

- IT 7440-05-3, Palladium, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalysts from alumina and, effect of ceria promoter on activity
and structure of)
- IT 1306-38-3, Cerium dioxide, uses and miscellaneous
RL: USES (Uses)
(promoter, for palladium-alumina
catalysts, activity and structure in relation to)
- L54 ANSWER 87 OF 88 CAPLUS COPYRIGHT 2004 ACS on STN
1974:442056 Document No. 81:42056 Catalytic compositions. Hindin, Saul
G.;
Dettling, Joseph C. (Engelhard Minerals and Chemicals Corp.). Ger.
Offen.
DE 2339512 19740221, 22 pp. (German). CODEN: GWXXBX. APPLICATION:
DE 1973-2339512 19730803.
AB Catalysts for the afterburning of combustion gases, that consist of a
Pt group metal and Cu, Cr, and a rare metal as promoters and are
active and stable at high temps., are described. The catalysts may be
prepd. by impregnating activated Al₂O₃ pellets with solns. of
Cu(CH₃COO)₂, H₂CrO₄, Ce(NO₃)₃ and Pd(NO₃)₂, then
drying at 100° and igniting at 1000°. In a variant
procedure, the soln. contg. the promoters was mixed with powd.
Al₂O₃ and pellets shaped by extrusion. The pellets were then
dried at 80° and ignited 2 hr at 1000°; after being
impregnated with Pd(NO₃)₂ soln. they were calcined once more 2
hr at 500°. The finished catalyst contained 0.02 Pd, 1.2
CuO, 4.1 Cr₂O₃, 4.7 CeO₂ and 90 wt. % Al₂O₃.
- IC B01J; F01N; C07B
CC 67-1 (Catalysis and Reaction Kinetics)
Section cross-reference(s): 59
- IT 1306-38-3 1308-38-9, uses and miscellaneous 1317-38-0, uses and
miscellaneous 7440-05-3, uses and miscellaneous
RL: CAT (Catalyst use); USES (Uses)
(catalyst, for oxidn. of exhaust gases)